

# **DAHLGREN WASTEWATER TREATMENT PLANT**

VPDES PERMIT No. VA0026514

**0.97 MGD  
VIRGINIA POLLUTANT DISCHARGE ELIMINATION SYSTEM  
PERMIT APPLICATION - 2013**



**KING GEORGE COUNTY SERVICE AUTHORITY**

9207 Kings Highway  
King George, VA 22485  
Phone: (540)775-2746  
Fax: (540) 775-5560

Prepared and submitted by:



P. O. BOX 5881  
Midlothian, VA 23112  
Phone: (804) 744-1792 | Fax: (804) 545-9072  
E-mail: [info@retaweng.com](mailto:info@retaweng.com)

**July 15, 2013**



**Mailing:** P. O BOX 5881, Midlothian, Virginia 23112  
**Phone:** (804) 744-1792 | **Fax:** (804) 545-9075  
**Location:** 2903 Sagecreek Circle, Midlothian, VA 23112



July 17, 2013

Sent Via- Email

Ms Joan C. Crowther,  
Permit Writer, Northern Regional Office  
Virginia Department of Environmental Quality  
13901 Crown Court  
Woodbridge, VA 22193

**Re: Application for VPDES Permit No. VA0026514 Dahlgren Wastewater Treatment Plant**

Dear Ms. Crowther:

Enclosed is a VPDES permit application for the Dahlgren Wastewater Treatment Plant (WWTP) submitted on behalf of the King George County Service Authority. This application is for the issuance and modification of the existing VPDES permit for the 1.0 MGD facility which expires January 11, 2014 at a revised Design capacity of 0.97 MGD. According to the VPDES permit, the application must be submitted 180 days before the expiration date or by July 15, 2013. Retaw Engineering requested, and was granted an extension via email to July 17, 2013. A hard copy of this application has been mailed to you.

This application contains the following documents:

1. Cover Letter	1
2. EPA Form 3510-1A	2
3. EPA Form 3510-2A	22
a. Attachment A –Part D – Expanded Testing Data	
b. Attachment B –Part E – Toxicity Test Results	
c. Figure 1 - Topography Map	1
d. Figure 2 - Vicinity & Topographic Map	1
e. Figure 3 - Location of Wastewater Treatment Plant & Service Area	1
4. Description of existing facility	
a. Figure 4 -Process Flow Diagram	
b. Chemical Use Narrative	1
c. Chemical Used	1
5. Attachment C – Belt Filter Press Sludge Cake Test Results	4
6. VPDES Permit Application Addendum	1
7. Sludge Application Form	18
8. Attachment D:	
a. Sludge generation and handling at the Dahlgren WWTP	2
b. Process Flow Diagram - Sludge digestion & Dewatering	1
c. Dewatered Sludge hauling route (to the King George landfill)	1
9. Completed Public Notice & Billing Authorization form	1

Should you have any questions or need clarifications regarding this application, please feel free to contact me at (804) 245 2979 or Mr. Christopher F. Thomas, P.E., at the King George County Service Authority, (540) 775-8563.

Very Truly Yours,

  
Ignatius Mutoti, PhD, PE  
Retaw Engineering

**Markets:** Municipal ♦ State ♦ Federal ♦ Industrial ♦ Commercial Developer

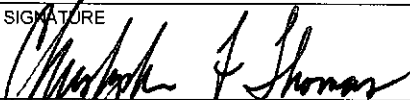
**Services:** Planning ♦ Permitting ♦ Bench-scale Testing ♦ Pilot-scale Studies ♦ Distribution System – Hydraulic & Water Quality Modeling  
Engineering Design ♦ Construction Administration ♦ Reuse ♦ Plant Operations –Process Troubleshooting & Optimization - Training - O&M Manuals

*Applying Innovative, Sound Engineering & Scientific Principles & Practices to Solve Your Problems*

*Page Intentionally Left Blank*

FORM 1 GENERAL		U.S. ENVIRONMENTAL PROTECTION AGENCY GENERAL INFORMATION Consolidated Permits Program (Read the "General Instructions" before starting.)		I. EPA I.D. NUMBER			
				S	T/A		
				F	D		
				1	2		
LABEL ITEMS		PLEASE PLACE LABEL IN THIS SPACE		GENERAL INSTRUCTIONS			
I. EPA I.D. NUMBER				If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (the area to the left of the label space lists the information that should appear), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete items I, III, V, and VI (except VI-B which must be completed regardless). Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.			
III. FACILITY NAME							
V. FACILITY MAILING ADDRESS							
VI. FACILITY LOCATION							
II. POLLUTANT CHARACTERISTICS							
INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of <b>bold-faced terms</b> .							
SPECIFIC QUESTIONS		Mark "X"		SPECIFIC QUESTIONS			
		YES	NO	FORM ATTACHED	YES	NO	FORM ATTACHED
A. Is this facility a <b>publicly owned treatment works</b> which results in a <b>discharge to waters of the U.S.</b> ? (FORM 2A)		X		X	B. Does or will this facility (either existing or proposed) include a <b>concentrated animal feeding operation</b> or <b>aquatic animal production facility</b> which results in a <b>discharge to waters of the U.S.</b> ? (FORM 2B)		X
		16	17	18		19	20
C. Is this a facility which currently results in <b>discharges to waters of the U.S.</b> other than those described in A or B above? (FORM 2C)			X		D. Is this a proposed facility (other than those described in A or B above) which will result in a <b>discharge to waters of the U.S.</b> ? (FORM 2D)		X
		22	23	24		25	26
E. Does or will this facility treat, store, or dispose of <b>hazardous wastes</b> ? (FORM 3)			X		F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X
		28	29	30		31	32
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)			X		H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X
		34	35	36		37	38
I. Is this facility a proposed <b>stationary source</b> which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)			X		J. Is this facility a proposed <b>stationary source</b> which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X
		40	41	42		43	44
III. NAME OF FACILITY							
C. SKIP							
1 DAHLGREN WASTEWATER TREATMENT PLANT							
15 16 - 29 30 69							
IV. FACILITY CONTACT							
A. NAME & TITLE (last, first, & title)							
C. HOCKADAY, JEFF, WASTEWATER MANAGER							
15 16 45 46 48 49 51 52 55							
B. PHONE (area code & no.)							
(540) 775-2746							
V. FACILITY MAILING ADDRESS							
A. STREET OR P.O. BOX							
C. 9207 KINGS HIGHWAY							
15 16 45							
B. CITY OR TOWN							
C. KING GEORGE							
15 16 49 41 42 47 51							
D. STATE							
VA							
E. ZIP CODE							
22485							
VI. FACILITY LOCATION							
A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER							
C. 16383 DAHLGREN ROAD							
15 16 45							
B. COUNTY NAME							
King George							
46 70							
C. CITY OR TOWN							
C. King George							
15 16 40 41 42 47 51 52 54							
D. STATE							
VA							
E. ZIP CODE							
22485							
F. COUNTY CODE (if known)							

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)																
A. FIRST										B. SECOND						
C										C						
7	4	9	5	2	(specify) Sewage Treatment Plant or Facility					7	(specify)					
15	16	17	18	19						15	16	17	18	19		
C. THIRD										D. FOURTH						
C										C						
7	(specify)									7	(specify)					
15	16	17	18	19						15	16	17	18	19		
VIII. OPERATOR INFORMATION																
A. NAME													B. Is the name listed in Item VIII-A also the owner?			
C																
8	King George County Service Authority													<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29		
C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box: if "Other," specify.)													D. PHONE (area code & no.)			
F = FEDERAL S = STATE P = PRIVATE M = PUBLIC (other than federal or state) O = OTHER (specify)													(specify) (540) 775-2746			
E. STREET OR P.O. BOX																
9207 Kings Highway																
F. CITY OR TOWN																
King George																
G. STATE																
VA																
H. ZIP CODE																
22485																
IX. INDIAN LAND																
Is the facility located on Indian lands?																
<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO																
X. EXISTING ENVIRONMENTAL PERMITS																
A. NPDES (Discharges to Surface Water)										D. PSD (Air Emissions from Proposed Sources)						
C	T	I								C	T	I				
9	N									9	P					
15	16	17	18	19	20	21	22	23	24	15	16	17	18	19		
B. UIC (Underground Injection of Fluids)										E. OTHER (specify)						
C	T	I								C	T	I				
9	U									9						
15	16	17	18	19	20	21	22	23	24	15	16	17	18	19		
C. RCRA (Hazardous Wastes)										E. OTHER (specify)						
C	T	I								C	T	I				
9	R									9						
15	16	17	18	19	20	21	22	23	24	15	16	17	18	19		
XI. MAP																
Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers, and other surface water bodies in the map area. See instructions for precise requirements.																
XII. NATURE OF BUSINESS (provide a brief description)																
Wastewater Treatment Plant in King George County, Virginia.																
The existing plant is a 1.0 MGD Oxidation ditch Public Owned Treatment Works (POTW) treating domestic wastewater - Residential and Businesses. The existing Plant is currently undergoing design upgrades to enhance treatment. However, the additional upgrades for enhanced treatment for the removal of nitrogen will result in reduction in Plant hydraulic capacity from 1.0 MGD to 0.97 MGD																
XIII. CERTIFICATION (see instructions)																
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.																
A. NAME & OFFICIAL TITLE (type or print)										B. SIGNATURE					C. DATE SIGNED	
Christopher F. Thomas PE, General Manager															7-12-2013	
COMMENTS FOR OFFICIAL USE ONLY																
C																
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29		

## **Disclaimer**

This is an updated PDF document that allows you to type your information directly into the form and to save the completed form. This form is the most updated form currently available.

Note: This form can be viewed and saved only using Adobe Acrobat Reader version 7.0 or higher, or if you have the full Adobe Professional version.

**Instructions:**

1. Type in your information
2. Save file (if desired)
3. Print the completed form
4. Sign and date the printed copy
5. Mail it to the directed contact.

FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

FORM  
2A  
NPDES

## NPDES FORM 2A APPLICATION OVERVIEW

### APPLICATION OVERVIEW

Form 2A has been developed in a modular format and consists of a "Basic Application Information" packet and a "Supplemental Application Information" packet. The Basic Application Information packet is divided into two parts. All applicants must complete Parts A and C. Applicants with a design flow greater than or equal to 0.1 mgd must also complete Part B. Some applicants must also complete the Supplemental Application Information packet. The following items explain which parts of Form 2A you must complete.

### BASIC APPLICATION INFORMATION:

- A. **Basic Application Information for all Applicants.** All applicants must complete questions A.1 through A.8. A treatment works that discharges effluent to surface waters of the United States must also answer questions A.9 through A.12.
- B. **Additional Application Information for Applicants with a Design Flow  $\geq$  0.1 mgd.** All treatment works that have design flows greater than or equal to 0.1 million gallons per day must complete questions B.1 through B.6.
- C. **Certification.** All applicants must complete Part C (Certification).

### SUPPLEMENTAL APPLICATION INFORMATION:

- D. **Expanded Effluent Testing Data.** A treatment works that discharges effluent to surface waters of the United States and meets one or more of the following criteria must complete Part D (Expanded Effluent Testing Data):
  - 1. Has a design flow rate greater than or equal to 1 mgd,
  - 2. Is required to have a pretreatment program (or has one in place), or
  - 3. Is otherwise required by the permitting authority to provide the information.
- E. **Toxicity Testing Data.** A treatment works that meets one or more of the following criteria must complete Part E (Toxicity Testing Data):
  - 1. Has a design flow rate greater than or equal to 1 mgd,
  - 2. Is required to have a pretreatment program (or has one in place), or
  - 3. Is otherwise required by the permitting authority to submit results of toxicity testing.
- F. **Industrial User Discharges and RCRA/CERCLA Wastes.** A treatment works that accepts process wastewater from any significant industrial users (SIUs) or receives RCRA or CERCLA wastes must complete Part F (Industrial User Discharges and RCRA/CERCLA Wastes). SIUs are defined as:
  - 1. All industrial users subject to Categorical Pretreatment Standards under 40 Code of Federal Regulations (CFR) 403.6 and 40 CFR Chapter I, Subchapter N (see instructions); and
  - 2. Any other industrial user that:
    - a. Discharges an average of 25,000 gallons per day or more of process wastewater to the treatment works (with certain exclusions); or
    - b. Contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the treatment plant; or
    - c. Is designated as an SIU by the control authority.
- G. **Combined Sewer Systems.** A treatment works that has a combined sewer system must complete Part G (Combined Sewer Systems).

**ALL APPLICANTS MUST COMPLETE PART C (CERTIFICATION)**

FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

## BASIC APPLICATION INFORMATION

## PART A. BASIC APPLICATION INFORMATION FOR ALL APPLICANTS:

All treatment works must complete questions A.1 through A.8 of this Basic Application Information packet.

## A.1. Facility Information.

Facility name DAHLGREN WASTEWATER TREATMENT PLANTMailing Address 9207 KINGS HIGHWAY  
KING GEORGE, VIRGINIA 22485Contact person JEFF HOCKADAYTitle WASTEWATER MANAGERTelephone number (540) 775-2746Facility Address 16383 DAHLGREN ROAD  
(not P.O. Box) KING GEORGE, VIRGINIA 22485

## A.2. Applicant Information. If the applicant is different from the above, provide the following:

Applicant name King George County Service AuthorityMailing Address 9207 Kings Highway  
King George, VA 22485Contact person Christopher F. Thomas, PETitle General ManagerTelephone number (540) 775-2746

Is the applicant the owner or operator (or both) of the treatment works?

☒

owner

☒

operator

Indicate whether correspondence regarding this permit should be directed to the facility or the applicant.

☐

facility

☒

applicant

## A.3. Existing Environmental Permits. Provide the permit number of any existing environmental permits that have been issued to the treatment works (include state-issued permits).

NPDES VA0026514

PSD \_\_\_\_\_

UIC \_\_\_\_\_

Other VAN010060

RCRA \_\_\_\_\_

Other \_\_\_\_\_

## A.4. Collection System Information. Provide information on municipalities and areas served by the facility. Provide the name and population of each entity and, if known, provide information on the type of collection system (combined vs. separate) and its ownership (municipal, private, etc.).

Name	Population Served	Type of Collection System	Ownership
<u>Residential</u>	<u>5,240</u>	<u>Force Main/Gravity</u>	<u>Municipal</u>
<u>1 School</u>	<u>90 Equivalent Pop.</u>	<u>Force Main/Gravity</u>	<u>Municipal</u>
<u>Commercial</u>	<u>350 Equivalent Pop.</u>	<u>Force Main/Gravity</u>	<u>Municipal</u>
Total population served <u>5,680</u>			



## FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

## A.5. Indian Country.

- a. Is the treatment works located in Indian Country?

☐ Yes ☒ No

- b. Does the treatment works discharge to a receiving water that is either in Indian Country or that is upstream from (and eventually flows through) Indian Country?

☐ Yes ☒ No

## A.6. Flow. Indicate the design flow rate of the treatment plant (i.e., the wastewater flow rate that the plant was built to handle). Also provide the average daily flow rate and maximum daily flow rate for each of the last three years. Each year's data must be based on a 12-month time period with the 12th month of "this year" occurring no more than three months prior to this application submittal.

- a. Design flow rate
- 1.0
- mgd

	Two Years Ago	Last Year	This Year
b. Annual average daily flow rate	<u>0.272</u>	<u>0.206</u>	<u>0.307</u> mgd
c. Maximum daily flow rate	<u>0.373</u>	<u>0.376</u>	<u>0.683</u> mgd

## A.7. Collection System. Indicate the type(s) of collection system(s) used by the treatment plant. Check all that apply. Also estimate the percent contribution (by miles) of each.

☒ Separate sanitary sewer 100 %

☐ Combined storm and sanitary sewer \_\_\_\_\_ %

## A.8. Discharges and Other Disposal Methods.

- a. Does the treatment works discharge effluent to waters of the U.S.?
- ☒
- Yes
- ☐
- No

If yes, list how many of each of the following types of discharge points the treatment works uses:

i. Discharges of treated effluent 1

ii. Discharges of untreated or partially treated effluent 0

iii. Combined sewer overflow points 0

iv. Constructed emergency overflows (prior to the headworks) 0

v. Other \_\_\_\_\_ 0

- b. Does the treatment works discharge effluent to basins, ponds, or other surface impoundments that do not have outlets for discharge to waters of the U.S.?

☐ Yes ☒ No

If yes, provide the following for each surface impoundment:

Location: \_\_\_\_\_

Annual average daily volume discharged to surface impoundment(s) \_\_\_\_\_ mgd

Is discharge ☒ continuous or ☐ intermittent?

- c. Does the treatment works land-apply treated wastewater?

☐ Yes ☒ No

If yes, provide the following for each land application site:

Location: \_\_\_\_\_

Number of acres: \_\_\_\_\_

Annual average daily volume applied to site: \_\_\_\_\_ Mgd

Is land application ☐ continuous or ☐ intermittent?

- d. Does the treatment works discharge or transport treated or untreated wastewater to another treatment works?

☐ Yes ☒ No

**FACILITY NAME AND PERMIT NUMBER:**

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

If yes, describe the mean(s) by which the wastewater from the treatment works is discharged or transported to the other treatment works (e.g., tank truck, pipe).

\_\_\_\_\_

If transport is by a party other than the applicant, provide:

Transporter name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_  
\_\_\_\_\_

Contact person: \_\_\_\_\_

Title: \_\_\_\_\_

Telephone number: \_\_\_\_\_

For each treatment works that receives this discharge, provide the following:

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_  
\_\_\_\_\_

Contact person: \_\_\_\_\_

Title: \_\_\_\_\_

Telephone number: \_\_\_\_\_

If known, provide the NPDES permit number of the treatment works that receives this discharge. \_\_\_\_\_

Provide the average daily flow rate from the treatment works into the receiving facility. \_\_\_\_\_

mgd

- e. Does the treatment works discharge or dispose of its wastewater in a manner not included in A.8.a through A.8.d above (e.g., underground percolation, well injection)?

\_\_\_\_\_ Yes

\_\_\_\_\_ ☒ No

If yes, provide the following for each disposal method:

Description of method (including location and size of site(s) if applicable):

\_\_\_\_\_

Annual daily volume disposed of by this method: \_\_\_\_\_

Is disposal through this method \_\_\_\_\_

continuous or

\_\_\_\_\_ intermittent?

## FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

## WASTEWATER DISCHARGES:

If you answered "yes" to question A.8.a, complete questions A.9 through A.12 **once for each outfall** (including bypass points) through which effluent is discharged. Do not include information on combined sewer overflows in this section. If you answered "no" to question A.8.a, go to Part B, "Additional Application Information for Applicants with a Design Flow Greater than or Equal to 0.1 mgd."

## A.9. Description of Outfall.

- a. Outfall number 001
- b. Location DAHLGREN 22845  
(City or town, if applicable) (Zip Code)  
KING GEORGE VA  
(County) (State)  
38° 19' 23" N 77° 03' 10" W  
(Latitude) (Longitude)
- c. Distance from shore (if applicable) 100 ft.
- d. Depth below surface (if applicable) 2 ft.
- e. Average daily flow rate 0.306 mgd
- f. Does this outfall have either an intermittent or a periodic discharge?  
           Yes ✓ No (go to A.9.g.)
- If yes, provide the following information:
- Number of times per year discharge occurs:
- Average duration of each discharge:
- Average flow per discharge:                                  mgd
- Months in which discharge occurs:
- g. Is outfall equipped with a diffuser? ✓ Yes            No

## A.10. Description of Receiving Waters.

- a. Name of receiving water WILLIAMS CREEK
- b. Name of watershed (if known) UPPER MACHODOC CREEK
- United States Soil Conservation Service 14-digit watershed code (if known):
- c. Name of State Management/River Basin (if known): Potomac River
- United States Geological Survey 8-digit hydrologic cataloging unit code (if known):
- d. Critical low flow of receiving stream (if applicable):  
acute N/A cfs chronic N/A cfs
- e. Total hardness of receiving stream at critical low flow (if applicable).                                  mg/l of CaCO<sub>3</sub>

FACILITY NAME AND PERMIT NUMBER:

Form Approved 1/14/99  
OMB Number 2040-0086

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

**A.11. Description of Treatment.**

- a. What levels of treatment are provided? Check all that apply.

☐ Primary  
☒ Advanced

☒ Secondary  
☒ Other. Describe:
Tertiary-Nutrient Removal, Filters, UV Disinfection

- b. Indicate the following removal rates (as applicable):

Design BOD<sub>5</sub> removal or Design CBOD<sub>5</sub> removal 99 %

Design SS removal 98 %

Design P removal 96 %

Design N removal 91 %

Other TKN-N 95 %

- c. What type of disinfection is used for the effluent from this outfall? If disinfection varies by season, please describe.

Ultraviolet Disinfection

If disinfection is by chlorination, is dechlorination used for this outfall?

☐ Yes ☒ No

- d. Does the treatment plant have post aeration?

☒ Yes ☐ No

**A.12. Effluent Testing Information.** All Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three samples and must be no more than four and one-half years apart.

Outfall number: 001

PARAMETER	MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE		
	Value	Units	Value	Units	Number of Samples
pH (Minimum)	6.74	s.u.			
pH (Maximum)	8.79	s.u.			
Flow Rate	1.05	mgd	0.264	mgd	1275
Temperature (Winter)	20	°C	11.6	°C	540
Temperature (Summer)	30	°C	23.9	°C	613

\* For pH please report a minimum and a maximum daily value

POLLUTANT	MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML / MDL
	Conc.	Units	Conc.	Units	Number of Samples		

**CONVENTIONAL AND NONCONVENTIONAL COMPOUNDS.**

CONVERTING AND NONCONVERTIBLE DATA CODES:								
BIOCHEMICAL OXYGEN DEMAND (Report one)	BOD-5 CBOD-5	22.0	ppm	2.5	ppm	780	5210 (B)	2
FECAL COLIFORM		86	cfu/100mL	0.6	cfu/100mL	780	1600	2
TOTAL SUSPENDED SOLIDS (TSS)		52	ppm	7	ppm	780	2540 (D)	1.0

**END OF PART A.**

**REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE**

FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

## BASIC APPLICATION INFORMATION

### PART B. ADDITIONAL APPLICATION INFORMATION FOR APPLICANTS WITH A DESIGN FLOW GREATER THAN OR EQUAL TO 0.1 MGD (100,000 gallons per day).

All applicants with a design flow rate  $\geq 0.1$  mgd must answer questions B.1 through B.6. All others go to Part C (Certification).

**B.1. Inflow and Infiltration.** Estimate the average number of gallons per day that flow into the treatment works from inflow and/or infiltration.

N/A gpd

Briefly explain any steps underway or planned to minimize inflow and infiltration.

No significant Infiltration

**B.2. Topographic Map.** Attach to this application a topographic map of the area extending at least one mile beyond facility property boundaries. This map must show the outline of the facility and the following information. (You may submit more than one map if one map does not show the entire area.) **See Figure 1: DAHLGREN WASTEWATER TREATMENT PLANT VICINITY MAP**

- The area surrounding the treatment plant, including all unit processes.
- The major pipes or other structures through which wastewater enters the treatment works and the pipes or other structures through which treated wastewater is discharged from the treatment plant. Include outfalls from bypass piping, if applicable.
- Each well where wastewater from the treatment plant is injected underground.
- Wells, springs, other surface water bodies, and drinking water wells that are: 1) within 1/4 mile of the property boundaries of the treatment works, and 2) listed in public record or otherwise known to the applicant.
- Any areas where the sewage sludge produced by the treatment works is stored, treated, or disposed.
- If the treatment works receives waste that is classified as hazardous under the Resource Conservation and Recovery Act (RCRA) by truck, rail, or special pipe, show on the map where that hazardous waste enters the treatment works and where it is treated, stored, and/or disposed.

**B.3. Process Flow Diagram or Schematic.** Provide a diagram showing the processes of the treatment plant, including all bypass piping and all backup power sources or redundancy in the system. Also provide a water balance showing all treatment units, including disinfection (e.g., chlorination and dechlorination). The water balance must show daily average flow rates at influent and discharge points and approximate daily flow rates between treatment units. Include a brief narrative description of the diagram.

**See FIGURE 2" DAHLGREN WASTEWATER TREATMENT PLANT PROCESS FLOW DIAGRAM AND NARRATIVE**

#### B.4. Operation/Maintenance Performed by Contractor(s).

Are any operational or maintenance aspects (related to wastewater treatment and effluent quality) of the treatment works the responsibility of a contractor? Yes ☒ No

If yes, list the name, address, telephone number, and status of each contractor and describe the contractor's responsibilities (attach additional pages if necessary).

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Responsibilities of Contractor: \_\_\_\_\_

**B.5. Scheduled Improvements and Schedules of Implementation.** Provide information on any uncompleted implementation schedule or uncompleted plans for improvements that will affect the wastewater treatment, effluent quality, or design capacity of the treatment works. If the treatment works has several different implementation schedules or is planning several improvements, submit separate responses to question B.5 for each. (If none, go to question B.6.)

- List the outfall number (assigned in question A.9) for each outfall that is covered by this implementation schedule.

001

- Indicate whether the planned improvements or implementation schedule are required by local, State, or Federal agencies.

☒ Yes ☐ No



# TOPOGRAPHIC MAP: DAHLGREN WASTEWATER TREATMENT PLANT

My Mark-up Layer

Transportation

Roads

Highways

Railroad

Boundaries

County Boundary

Utility Lines

Water / Sewer

SANITARY

WATER

PlaceNames

FEMA Floodplains

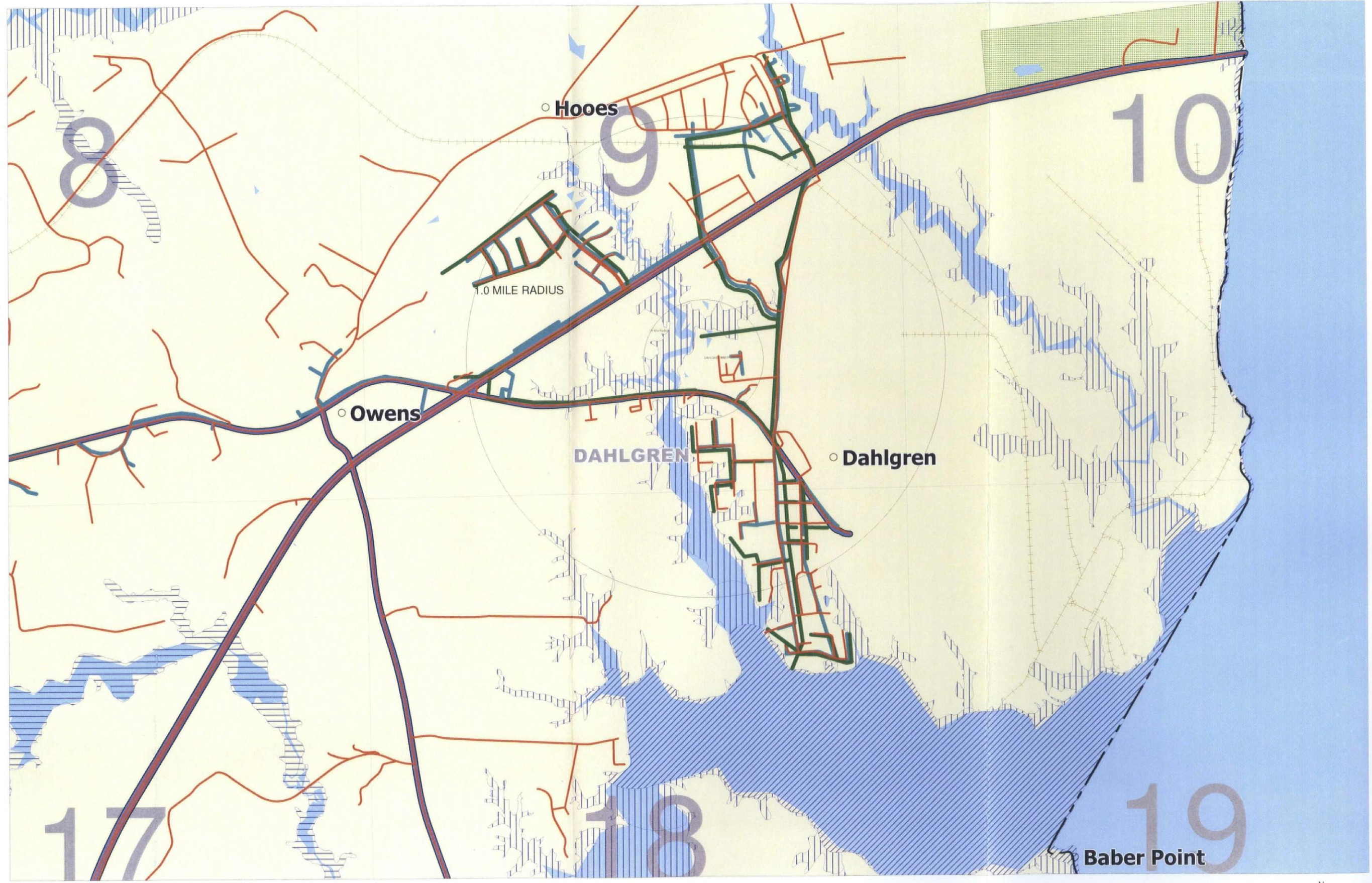
USGS Quads

GSQUAD Outlines

Water

Overlays

State Land



SCALE 1 : 25,000

2,000 0 2,000 4,000 6,000

FEET







24436 F.		<b>DAHLGREN WWTP VPDES PERMIT</b> KENS SPONGE, VA TOPOGRAPHIC MAP		SCALE 1" = 1/4 MI	DATE 04/78	DATE 04/15/2014	SECTION ENGINEERING 1001 SOUTHVIEW CIRCLE WASHINGTON, VA 22013 Phone: (800) 774-4763, Fax: (800) 345-8075
DRAWN BY DE	CHECKED BY INEP	DRAWN BY INEP	CHECKED BY INEP	DATE 04/78	DATE 04/15/2014	DATE 04/15/2014	DATE 04/15/2014



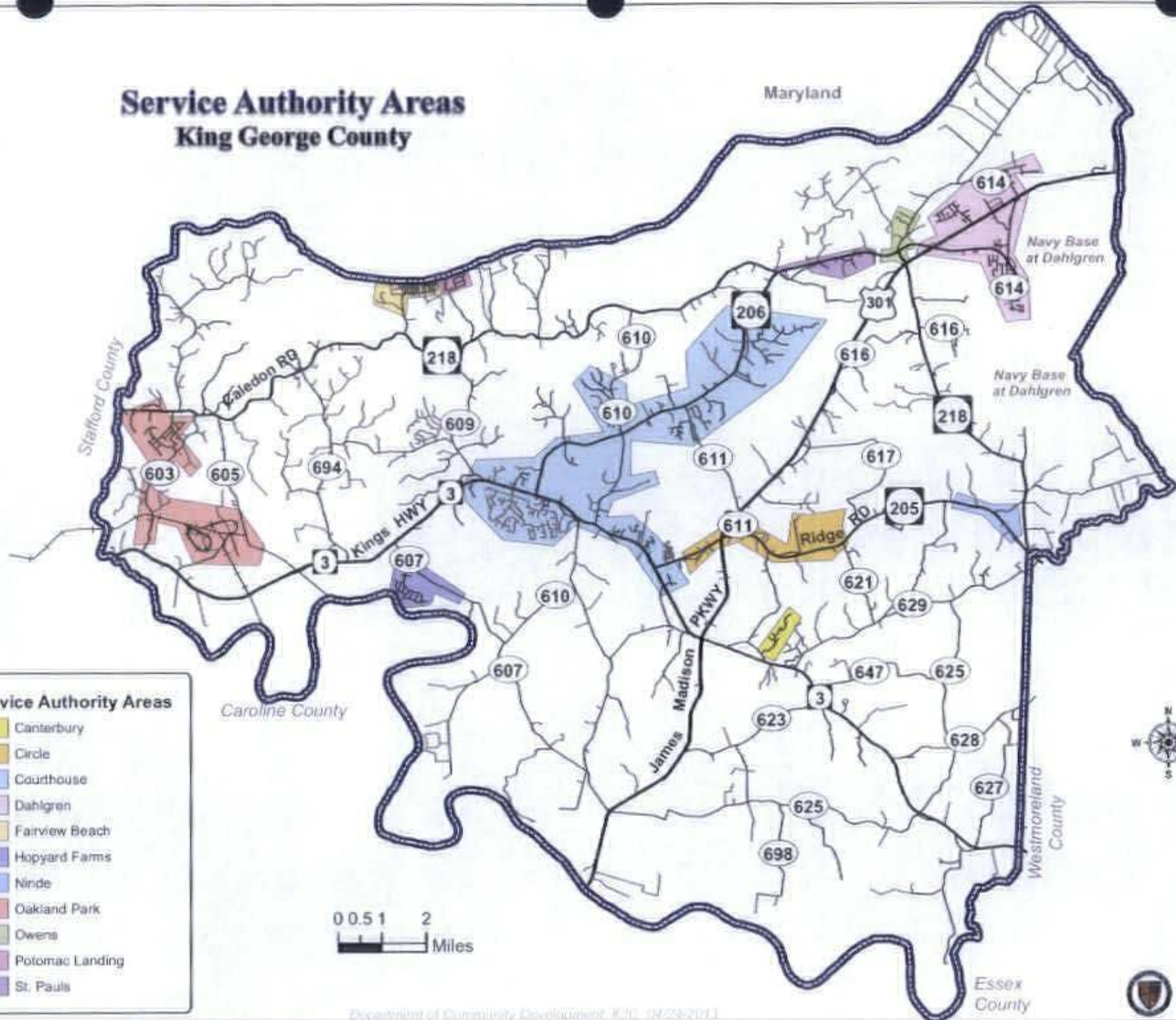
# DAHLGREN WWTP Site Plan (IMAGERY)





# Service Authority Areas King George County

Maryland

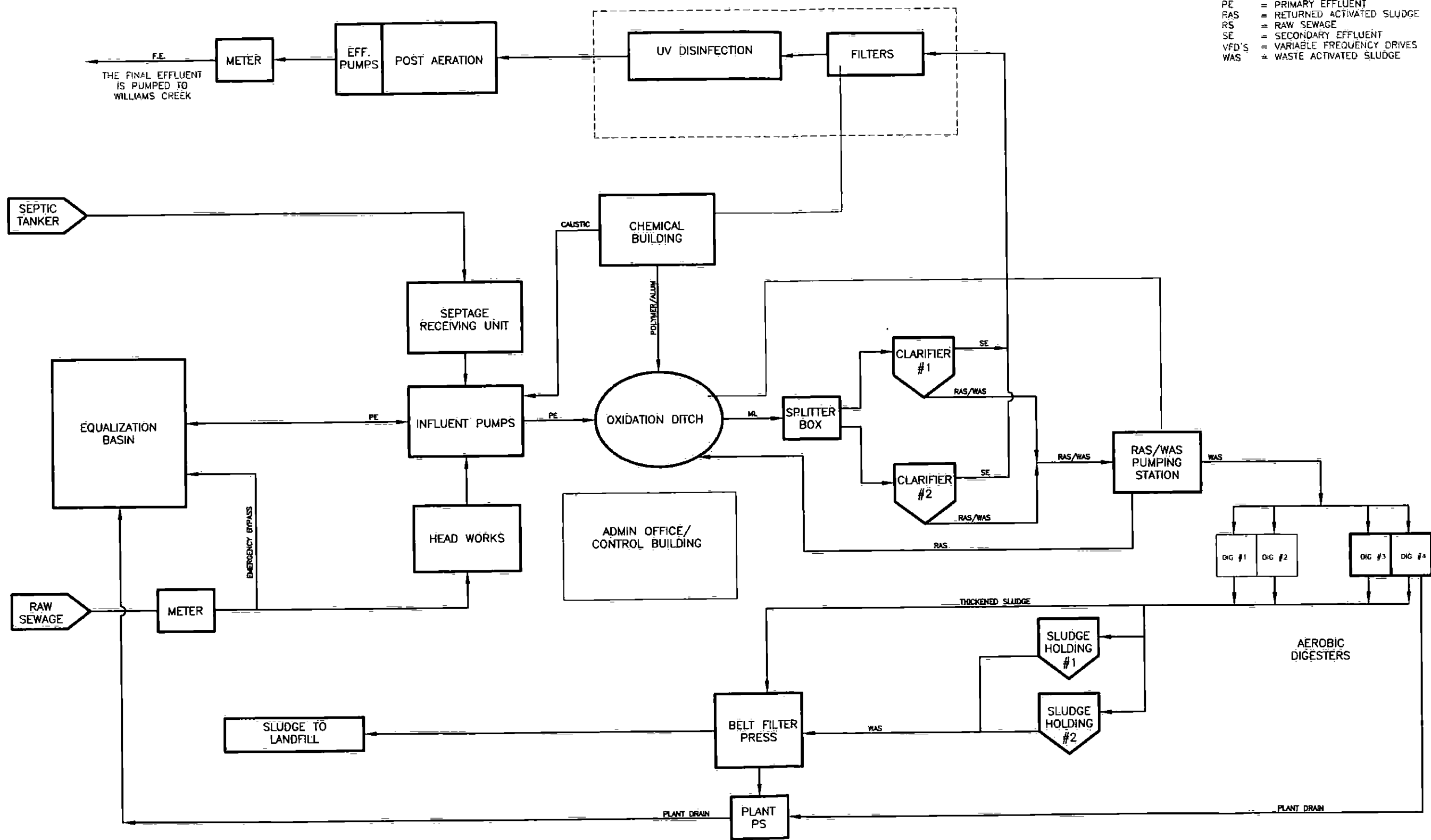


## Service Authority Areas

- Canterbury
- Circle
- Courthouse
- Dahlgren
- Fairview Beach
- Hopyard Farms
- Ninde
- Oakland Park
- Owens
- Potomac Landing
- St. Pauls

0 0.5 1 2  
Miles





LEGEND  
 FE = FINAL EFFLUENT  
 ML = MIXED LIQUOR  
 PE = PRIMARY EFFLUENT  
 RAS = RETURNED ACTIVATED SLUDGE  
 RS = RAW SEWAGE  
 SE = SECONDARY EFFLUENT  
 VFD'S = VARIABLE FREQUENCY DRIVES  
 WAS = WASTE ACTIVATED SLUDGE

**RETAW ENGINEERING LLC.**

THIS DRAWING PREPARED BY  
 RETAW ENGINEERING  
 2803 Sycamore Circle | Midlothian, VA 23112  
 TEL 804.744.1792 | FAX 804.545.0075 | www.retaw.com

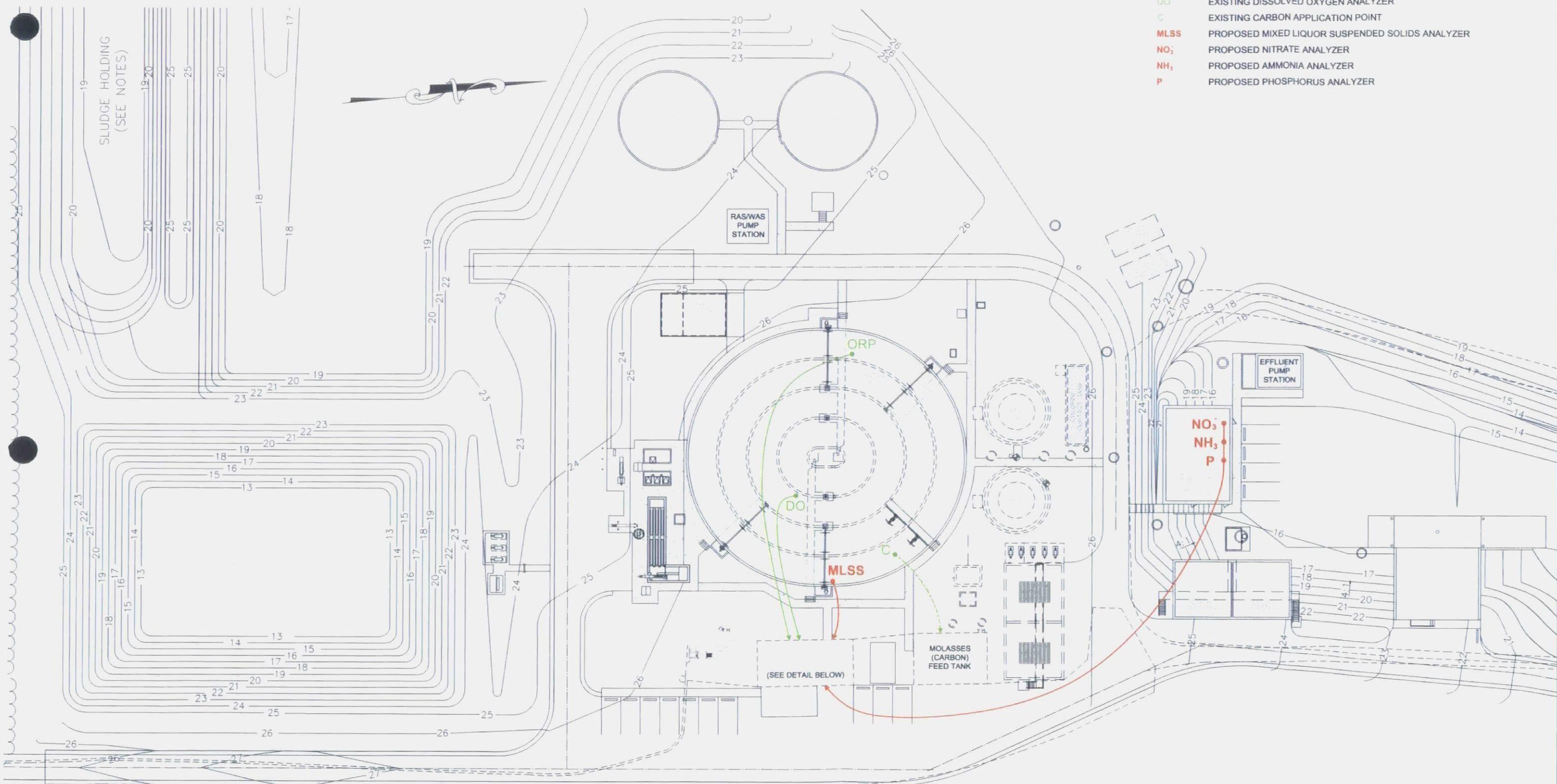
PLANNING	PERMITTING	DESIGN	OPERATIONS
DATE	DATE	DATE	DATE
10/17/07			
DRAWN BY			
NITUL C. PATEL			
DESIGNED BY			
L. MITTITI			
CHECKED BY			
L. MITTITI			
SCALE			
NTS			

DAHLGREN WWTP ENR INSTRUMENTATION  
 KING GEORGE SERVICE AUTHORITY  
 PROCESS FLOW DIAGRAM

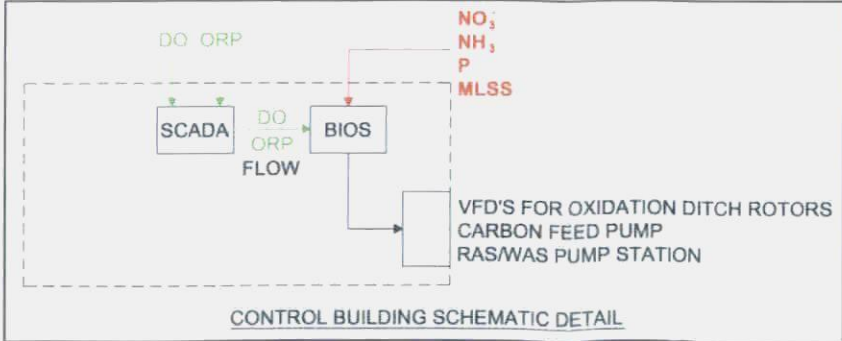
SHEET NO.  
 PER-02

These plans and associated documents are the exclusive property of RETAW ENGINEERING and may not be reproduced in whole or in part and shall not be used for any purpose other than the project for which they were prepared without the written consent of RETAW ENGINEERING.





- LEGEND**
- GRP EXISTING OXIDATION/REDUCTION POTENTIAL ANALYZER
  - DO EXISTING DISSOLVED OXYGEN ANALYZER
  - C EXISTING CARBON APPLICATION POINT
  - MLSS PROPOSED MIXED LIQUOR SUSPENDED SOLIDS ANALYZER
  - NO<sub>3</sub> PROPOSED NITRATE ANALYZER
  - NH<sub>3</sub> PROPOSED AMMONIA ANALYZER
  - P PROPOSED PHOSPHORUS ANALYZER



# RETAW ENGINEERING LLC.

**DAHLGREN WWTP ENR INSTRUMENTATION**  
 KING GEORGE SERVICE AUTHORITY  
**OVERALL SITE PLAN**

THIS DRAWING PREPARED BY  
RETAW ENGINEERING

2903 Sagecreek Circle | Midlothian, VA 23112  
TEL 804.744.1792 FAX 804.545.0075 www.retaweng.com

PLANNING	PERMITTING	DESIGN	OPERATIONS
DATE	REVISION DESCRIPTION		
02/01/12			
DRAWN BY			
DESIGNED BY			
CHECKED BY			
SCALE			
NTS			

## CHEMICAL INVENTORY

Below is a list of chemicals used at the Dahlgren Wastewater Treatment Plant and estimated quantities stored at the facility. Actual quantities will depend on when an order was made and the usage rate at that particular time.

CHEMICAL	USE	ESTIMATED QUANTITIES
Alum (Dry)	Phosphorus removal to meet effluent limit	60 x 50 lb Bags
Molasses (Plant switch to BiocarbND 80)	Currently facility is using Molasses but is in the process of switching to BiocarbND 80 due to its higher COD value of approximate 1,200,000 mg/L compared to molasses COD value of approximately 690,000 mg/L. Supplement cBOD5 to Enhance denitrification and overall nitrogen removal to meet limit of 4.0 mg/L	3,500 Gallons
Soda Ash	Supplement Alkalinity for enhanced Nitrogen removal and pH control, on as needed basis	30 x 50 lb Bags

## FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

- c. If the answer to B.5.b is "Yes," briefly describe, including new maximum daily inflow rate (if applicable).

- d. Provide dates imposed by any compliance schedule or any actual dates of completion for the implementation steps listed below, as applicable. For improvements planned independently of local, State, or Federal agencies, indicate planned or actual completion dates, as applicable. Indicate dates as accurately as possible.

Implementation Stage	Schedule MM / DD / YYYY	Actual Completion MM / DD / YYYY
- Begin construction	11 / 30 / 2013	___ / ___ / ___
- End construction	9 / 29 / 2014	___ / ___ / ___
- Begin discharge	10 / 01 / 2014	___ / ___ / ___
- Attain operational level	01 / 01 / 2015	___ / ___ / ___

- e. Have appropriate permits/clearances concerning other Federal/State requirements been obtained? ☐ Yes ☒ No

Describe briefly: Plans and Specifications currently under DEQ Review.  
Certificate to Construct anticipated Aug 09, 2013 (tentative)

**B.6. EFFLUENT TESTING DATA (GREATER THAN 0.1 MGD ONLY).**

Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three pollutant scans and must be no more than four and one-half years old.

Outfall Number: 001

POLLUTANT	MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML / MDL
	Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NONCONVENTIONAL COMPOUNDS.							
AMMONIA (as N)	2.8	mg/L	0.21	mg/L	156	4500-NH3 F	0.1
CHLORINE (TOTAL RESIDUAL, TRC)	NotRequired						
DISSOLVED OXYGEN	15.7	mg/L	9.6	mg/L	1092	4500-G	0.1
TOTAL KJELDAHL NITROGEN (TKN)	33.6	mg/L	5.8	mg/L	48	4500-NH3F	0.1
NITRATE PLUS NITRITE NITROGEN	9.55	mg/L	4.0	mg/L	156	300.0/4500-NO2-	B 0.1 & 0.01
OIL and GREASE	PENDING	mg/L	PENDING	mg/L	*****	5520	5
PHOSPHORUS (Total)	0.92	mg/L	0.29	mg/L	780	4500-P-E	0.01
TOTAL DISSOLVED SOLIDS (TDS)	PENDING	mg/L	PENDING	mg/L	*****	2540 C	1
OTHER (T. Hardness)	85	mg/L	32	mg/L	52	2340C	2

**END OF PART B.**

**REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE**

**FACILITY NAME AND PERMIT NUMBER:**

DHALGREN WASTEWATER TREATMENT PLANT, VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086**BASIC APPLICATION INFORMATION****PART C. CERTIFICATION**

All applicants must complete the Certification Section. Refer to instructions to determine who is an officer for the purposes of this certification. All applicants must complete all applicable sections of Form 2A, as explained in the Application Overview. Indicate below which parts of Form 2A you have completed and are submitting. By signing this certification statement, applicants confirm that they have reviewed Form 2A and have completed all sections that apply to the facility for which this application is submitted.

**Indicate which parts of Form 2A you have completed and are submitting:**

Basic Application Information packet

Supplemental Application Information packet:



Part D (Expanded Effluent Testing Data)



Part E (Toxicity Testing: Biomonitoring Data)



Part F (Industrial User Discharges and RCRA/CERCLA Wastes)



Part G (Combined Sewer Systems)

**ALL APPLICANTS MUST COMPLETE THE FOLLOWING CERTIFICATION.**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and official title Christopher F. Thomas PE, General ManagerSignature *Christopher F. Thomas*Telephone number (540) 775-2746Date signed July 12, 2013

Upon request of the permitting authority, you must submit any other information necessary to assess wastewater treatment practices at the treatment works or identify appropriate permitting requirements.

**SEND COMPLETED FORMS TO:**

Joan C. Crowther  
VPDES Permit Writer  
Virginia Department of Environmental Quality  
Northern Regional Office  
13901 Crown Court  
Woodbridge, VA 22193  
Phone: (703) 583-3925  
Email address: joan.crowther@deq.virginia.gov

FACILITY NAME AND PERMIT NUMBER:

Form Approved 1/14/99  
OMB Number 2040-0086

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

## SUPPLEMENTAL APPLICATION INFORMATION

## PART D. EXPANDED EFFLUENT TESTING DATA

Refer to the directions on the cover page to determine whether this section applies to the treatment works.

**Effluent Testing: 1.0 mgd and Pretreatment Treatment Works.** If the treatment works has a design flow greater than or equal to 1.0 mgd or it has (or is required to have) a pretreatment program, or is otherwise required by the permitting authority to provide the data, then provide effluent testing data for the following pollutants. Provide the indicated effluent testing information and any other information required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analyses conducted using 40 CFR Part 136 methods. In addition, these data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. Indicate in the blank rows provided below any data you may have on pollutants not specifically listed in this form. At a minimum, effluent testing data must be based on at least three pollutant scans and must be no more than four and one-half years old.

See Attachment A - LAB DATA: EXPANDED EFFLUENT TEST RESULTS

Outfall number: 001 (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
<b>METALS (TOTAL RECOVERABLE), CYANIDE, PHENOLS, AND HARDNESS.</b>											
ANTIMONY											
ARSENIC											
BERYLLIUM											
CADMIUM											
CHROMIUM											
COPPER											
LEAD											
MERCURY											
NICKEL											
SELENIUM											
SILVER											
THALLIUM											
ZINC											
CYANIDE											
TOTAL PHENOLIC COMPOUNDS											
HARDNESS (AS CaCO <sub>3</sub> )											
Use this space (or a separate sheet) to provide information on other metals requested by the permit writer.											

## FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

Outfall number: \_\_\_\_\_ (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
<b>VOLATILE ORGANIC COMPOUNDS.</b>											
ACROLEIN											
ACRYLONITRILE											
BENZENE											
BROMOFORM											
CARBON TETRACHLORIDE											
CHLOROBENZENE											
CHLORODIBROMO-METHANE											
CHLOROETHANE											
2-CHLORO-ETHYL VINYL ETHER											
CHLOROFORM											
DICHLOROBROMO-METHANE											
1,1-DICHLOROETHANE											
1,2-DICHLOROETHANE											
TRANS-1,2-DICHLORO-ETHYLENE											
1,1-DICHLOROETHYLENE											
1,2-DICHLOROPROPANE											
1,3-DICHLORO-PROPYLENE											
ETHYLBENZENE											
METHYL BROMIDE											
METHYL CHLORIDE											
METHYLENE CHLORIDE											
1,1,2,2-TETRACHLORO-ETHANE											
TETRACHLORO-ETHYLENE											
TOLUENE											



## FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

Outfall number: \_\_\_\_\_ (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/ MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
1,1,1-TRICHLOROETHANE											
1,1,2-TRICHLOROETHANE											
TRICHLORETHYLENE											
VINYL CHLORIDE											

Use this space (or a separate sheet) to provide information on other volatile organic compounds requested by the permit writer.

--	--	--	--	--	--	--	--	--	--	--	--

## ACID-EXTRACTABLE COMPOUNDS

P-CHLORO-M-CRESOL											
2-CHLOROPHENOL											
2,4-DICHLOROPHENOL											
2,4-DIMETHYLPHENOL											
4,6-DINITRO-O-CRESOL											
2,4-DINITROPHENOL											
2-NITROPHENOL											
4-NITROPHENOL											
PENTACHLOROPHENOL											
PHENOL											
2,4,6-TRICHLOROPHENOL											

Use this space (or a separate sheet) to provide information on other acid-extractable compounds requested by the permit writer.

--	--	--	--	--	--	--	--	--	--	--	--

## BASE-NEUTRAL COMPOUNDS

ACENAPHTHENE											
ACENAPHTHYLENE											
ANTHRACENE											
BENZIDINE											
BENZO(A)ANTHRACENE											
BENZO(A)PYRENE											

## FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

Outfall number: \_\_\_\_\_ (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
3,4 BENZO-FLUORANTHENE											
BENZO(GH)PERYLENE											
BENZO(K)FLUORANTHENE											
BIS (2-CHLOROETHOXY) METHANE											
BIS (2-CHLOROETHYL)-ETHER											
BIS (2-CHLOROISO-PROPYL) ETHER											
BIS (2-ETHYLHEXYL) PHTHALATE											
4-BROMOPHENYL PHENYL ETHER											
BUTYL BENZYL PHTHALATE											
2-CHLORONAPHTHALENE											
4-CHLORPHENYL PHENYL ETHER											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
DI-N-OCTYL PHTHALATE											
DIBENZO(A,H) ANTHRACENE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
3,3-DICHLOROBENZIDINE											
DIETHYL PHTHALATE											
DIMETHYL PHTHALATE											
2,4-DINITROTOLUENE											
2,6-DINITROTOLUENE											
1,2-DIPHENYLHYDRAZINE											

## FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

Outfall number: \_\_\_\_\_ (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
FLUORANTHENE											
FLUORENE											
HEXACHLOROBENZENE											
HEXACHLOROBUTADIENE											
HEXACHLOROCYCLO-PENTADIENE											
HEXACHLOROETHANE											
INDENO(1,2,3-CD)PYRENE											
ISOPHORONE											
NAPHTHALENE											
NITROBENZENE											
N-NITROSODI-N-PROPYLAMINE											
N-NITROSODI- METHYLAMINE											
N-NITROSODI-PHENYLAMINE											
PHENANTHRENE											
PYRENE											
1,2,4-TRICHLOROBENZENE											

Use this space (or a separate sheet) to provide information on other base-neutral compounds requested by the permit writer.

Use this space (or a separate sheet) to provide information on other pollutants (e.g., pesticides) requested by the permit writer.

END OF PART D.

REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE

FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

## SUPPLEMENTAL APPLICATION INFORMATION

## PART E. TOXICITY TESTING DATA

POTWs meeting one or more of the following criteria must provide the results of whole effluent toxicity tests for acute or chronic toxicity for each of the facility's discharge points: 1) POTWs with a design flow rate greater than or equal to 1.0 mgd; 2) POTWs with a pretreatment program (or those that are required to have one under 40 CFR Part 403); or 3) POTWs required by the permitting authority to submit data for these parameters.

- At a minimum, these results must include quarterly testing for a 12-month period within the past 1 year using multiple species (minimum of two species), or the results from four tests performed at least annually in the four and one-half years prior to the application, provided the results show no appreciable toxicity, and testing for acute and/or chronic toxicity, depending on the range of receiving water dilution. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136.
- In addition, submit the results of any other whole effluent toxicity tests from the past four and one-half years. If a whole effluent toxicity test conducted during the past four and one-half years revealed toxicity, provide any information on the cause of the toxicity or any results of a toxicity reduction evaluation, if one was conducted.
- If you have already submitted any of the information requested in Part E, you need not submit it again. Rather, provide the information requested in question E.4 for previously submitted information. If EPA methods were not used, report the reasons for using alternate methods. If test summaries are available that contain all of the information requested below, they may be submitted in place of Part E.

If no biomonitoring data is required, do not complete Part E. Refer to the Application Overview for directions on which other sections of the form to complete.

## E.1. Required Tests.

Indicate the number of whole effluent toxicity tests conducted in the past four and one-half years.

\_\_\_\_ chronic      \_\_\_\_ acute

**E.2. Individual Test Data.** Complete the following chart for each whole effluent toxicity test conducted in the last four and one-half years. Allow one column per test (where each species constitutes a test). Copy this page if more than three tests are being reported.

Test number: \_\_\_\_\_ Test number: \_\_\_\_\_ Test number: \_\_\_\_\_

## a. Test information.

Test species & test method number			
Age at initiation of test			
Outfall number			
Dates sample collected			
Date test started			
Duration			

## b. Give toxicity test methods followed.

Manual title			
Edition number and year of publication			
Page number(s)			

## c. Give the sample collection method(s) used. For multiple grab samples, indicate the number of grab samples used.

24-Hour composite			
Grab			

## d. Indicate where the sample was taken in relation to disinfection. (Check all that apply for each)

Before disinfection			
After disinfection			
After dechlorination			

FACILITY NAME AND PERMIT NUMBER:

Form Approved 1/14/99  
OMB Number 2040-0086

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Test number: \_\_\_\_\_

Test number: \_\_\_\_\_

Test number: \_\_\_\_\_

e. Describe the point in the treatment process at which the sample was collected.

Sample was collected:

f. For each test, include whether the test was intended to assess chronic toxicity, acute toxicity, or both.

Chronic toxicity

Acute toxicity

g. Provide the type of test performed.

Static

Static-renewal

Flow-through

h. Source of dilution water. If laboratory water, specify type; if receiving water, specify source.

Laboratory water

Receiving water

i. Type of dilution water. If salt water, specify "natural" or type of artificial sea salts or brine used.

Fresh water

Salt water

j. Give the percentage effluent used for all concentrations in the test series.

k. Parameters measured during the test. (State whether parameter meets test method specifications)

pH

Salinity

Temperature

Ammonia

Dissolved oxygen

l. Test Results.

Acute:

Percent survival in 100%  
effluent

%

%

%

LC<sub>50</sub>

95% C.I.

%

%

%

Control percent survival

%

%

%

Other (describe)

**FACILITY NAME AND PERMIT NUMBER:**

**DAHLGREN WASTEWATER TREATMENT PLANT VA0026514**

Chronic:

NOEC	%	%	%
IC <sub>25</sub>	%	%	%
Control percent survival	%	%	%
Other (describe)			

m. Quality Control/Quality Assurance.

Is reference toxicant data available?			
Was reference toxicant test within acceptable bounds?			
What date was reference toxicant test run (MM/DD/YYYY)?			
Other (describe)			

**E.3. Toxicity Reduction Evaluation.** Is the treatment works involved in a Toxicity Reduction Evaluation?

\_\_\_ Yes \_\_\_ No      If yes, describe: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**E.4. Summary of Submitted Biomonitoring Test Information.** If you have submitted biomonitoring test information, or information regarding the cause of toxicity, within the past four and one-half years, provide the dates the information was submitted to the permitting authority and a summary of the results.

Date submitted: \_\_\_\_\_ (MM/DD/YYYY)

Summary of results: (see instructions)

\_\_\_\_\_  
\_\_\_\_\_

**END OF PART E.**

**REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.**

FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

## SUPPLEMENTAL APPLICATION INFORMATION

### PART F. INDUSTRIAL USER DISCHARGES AND RCRA/CERCLA WASTES

N/A

All treatment works receiving discharges from significant industrial users or which receive RCRA, CERCLA, or other remedial wastes must complete Part F.

#### GENERAL INFORMATION:

**F.1. Pretreatment Program.** Does the treatment works have, or is it subject to, an approved pretreatment program?

\_\_\_\_ Yes \_\_\_\_ No

**F.2. Number of Significant Industrial Users (SIUs) and Categorical Industrial Users (CIUs).** Provide the number of each of the following types of industrial users that discharge to the treatment works.

a. Number of non-categorical SIUs. \_\_\_\_\_

b. Number of CIUs. \_\_\_\_\_

#### SIGNIFICANT INDUSTRIAL USER INFORMATION:

Supply the following information for each SIU. If more than one SIU discharges to the treatment works, copy questions F.3 through F.8 and provide the information requested for each SIU.

**F.3. Significant Industrial User Information.** Provide the name and address of each SIU discharging to the treatment works. Submit additional pages as necessary.

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_  
\_\_\_\_\_

**F.4. Industrial Processes.** Describe all of the industrial processes that affect or contribute to the SIU's discharge.

\_\_\_\_\_

**F.5. Principal Product(s) and Raw Material(s).** Describe all of the principal processes and raw materials that affect or contribute to the SIU's discharge.

Principal product(s): \_\_\_\_\_

Raw material(s): \_\_\_\_\_

#### F.6. Flow Rate.

a. Process wastewater flow rate. Indicate the average daily volume of process wastewater discharged into the collection system in gallons per day (gpd) and whether the discharge is continuous or intermittent.

\_\_\_\_\_ gpd (\_\_\_\_ continuous or \_\_\_\_ intermittent)

b. Non-process wastewater flow rate. Indicate the average daily volume of non-process wastewater flow discharged into the collection system in gallons per day (gpd) and whether the discharge is continuous or intermittent.

\_\_\_\_\_ gpd (\_\_\_\_ continuous or \_\_\_\_ intermittent)

**F.7. Pretreatment Standards.** Indicate whether the SIU is subject to the following:

a. Local limits \_\_\_\_ Yes \_\_\_\_ No

b. Categorical pretreatment standards \_\_\_\_ Yes \_\_\_\_ No

If subject to categorical pretreatment standards, which category and subcategory?

\_\_\_\_\_

FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

**F.8. Problems at the Treatment Works Attributed to Waste Discharged by the SIU.** Has the SIU caused or contributed to any problems (e.g., upsets, interference) at the treatment works in the past three years?

☐ Yes ☐ No

If yes, describe each episode.

\_\_\_\_\_  
\_\_\_\_\_

**RCRA HAZARDOUS WASTE RECEIVED BY TRUCK, RAIL, OR DEDICATED PIPELINE:**

**F.9. RCRA Waste.** Does the treatment works receive or has it in the past three years received RCRA hazardous waste by truck, rail, or dedicated pipe? ☐ Yes ☐ No (go to F.12.)

**F.10. Waste Transport.** Method by which RCRA waste is received (check all that apply).

☐ Truck ☐ Rail ☐ Dedicated Pipe

**F.11. Waste Description.** Give EPA hazardous waste number and amount (volume or mass, specify units).

EPA Hazardous Waste Number

Amount

Units

<u>EPA Hazardous Waste Number</u>	<u>Amount</u>	<u>Units</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

**CERCLA (SUPERFUND) WASTEWATER, RCRA REMEDIATION/CORRECTIVE ACTION WASTEWATER, AND OTHER REMEDIAL ACTIVITY WASTEWATER:**

**F.12. Remediation Waste.** Does the treatment works currently (or has it been notified that it will) receive waste from remedial activities?

☐ Yes (complete F.13 through F.15.)

☐ No

Provide a list of sites and the requested information (F.13 - F.15.) for each current and future site.

**F.13. Waste Origin.** Describe the site and type of facility at which the CERCLA/RCRA/or other remedial waste originates (or is expected to originate in the next five years).

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**F.14. Pollutants.** List the hazardous constituents that are received (or are expected to be received). Include data on volume and concentration, if known. (Attach additional sheets if necessary).

\_\_\_\_\_  
\_\_\_\_\_

**F.15. Waste Treatment.**

a. Is this waste treated (or will it be treated) prior to entering the treatment works?

☐ Yes ☐ No

If yes, describe the treatment (provide information about the removal efficiency):

\_\_\_\_\_  
\_\_\_\_\_

b. Is the discharge (or will the discharge be) continuous or intermittent?

☐ Continuous

☐ Intermittent

If intermittent, describe discharge schedule.

\_\_\_\_\_

**END OF PART F.**  
**REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE**



FACILITY NAME AND PERMIT NUMBER:

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

## SUPPLEMENTAL APPLICATION INFORMATION

### PART G. COMBINED SEWER SYSTEMS

N/A

If the treatment works has a combined sewer system, complete Part G.

**G.1. System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

- a. All CSO discharge points.
- b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).
- c. Waters that support threatened and endangered species potentially affected by CSOs.

**G.2. System Diagram.** Provide a diagram, either in the map provided in G.1. or on a separate drawing, of the combined sewer collection system that includes the following information:

- a. Locations of major sewer trunk lines, both combined and separate sanitary.
- b. Locations of points where separate sanitary sewers feed into the combined sewer system.
- c. Locations of in-line and off-line storage structures.
- d. Locations of flow-regulating devices.
- e. Locations of pump stations.

### CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

**G.3. Description of Outfall.**

- a. Outfall number \_\_\_\_\_
- b. Location \_\_\_\_\_  
(City or town, if applicable) (Zip Code) \_\_\_\_\_  
(County) (State) \_\_\_\_\_  
(Latitude) (Longitude) \_\_\_\_\_
- c. Distance from shore (if applicable) \_\_\_\_\_ ft.
- d. Depth below surface (if applicable) \_\_\_\_\_ ft.
- e. Which of the following were monitored during the last year for this CSO?  
\_\_\_\_ Rainfall      \_\_\_\_ CSO pollutant concentrations      \_\_\_\_ CSO frequency  
\_\_\_\_ CSO flow volume      \_\_\_\_ Receiving water quality
- f. How many storm events were monitored during the last year? \_\_\_\_\_

**G.4. CSO Events.**

- a. Give the number of CSO events in the last year.  
\_\_\_\_\_ events (\_\_\_\_ actual or \_\_\_\_ approx.)
- b. Give the average duration per CSO event.  
\_\_\_\_\_ hours (\_\_\_\_ actual or \_\_\_\_ approx.)

**FACILITY NAME AND PERMIT NUMBER:**

DAHLGREN WASTEWATER TREATMENT PLANT VA0026514

Form Approved 1/14/99  
OMB Number 2040-0086

- c. Give the average volume per CSO event:

\_\_\_\_\_ million gallons (\_\_\_\_\_ actual or \_\_\_\_\_ approx.)

- d. Give the minimum rainfall that caused a CSO event in the last year:

\_\_\_\_\_ inches of rainfall

**G.5. Description of Receiving Waters.**

- a. Name of receiving water: \_\_\_\_\_

- b. Name of watershed/river/stream system: \_\_\_\_\_

United States Soil Conservation Service 14-digit watershed code (if known): \_\_\_\_\_

- c. Name of State Management/River Basin: \_\_\_\_\_

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): \_\_\_\_\_

**G.6. CSO Operations.**

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

\_\_\_\_\_  
\_\_\_\_\_**END OF PART G.****REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.**

Additional information, if provided, will appear on the following pages.

## PUBLIC NOTICE BILLING INFORMATION

I hereby authorize the Department of Environmental Quality to have the cost of publishing a public notice billed to the Agent/Department shown below. The public notice will be published once a week for two consecutive weeks in *the Free Lance Star* in accordance with 9 VAC25-31-290.C.2

Agent/Department to be billed: King George County Service Authority

Owner: King George County Service Authority

Agent/Department Address: 9207 Kings Highway  
King George, VA 22485

Agent's Telephone No.: (540) 775-2746

Printed Name: Christopher F. Thomas, PE

Authorizing Agent – Signature: *Christopher F. Thomas*

Date: July 12, 2013

VPDES Permit No.: VA0026514

Facility Name: DAHLGREN WASTEWATER TREATMENT PLANT

1. **Entity to whom the permit is to be issued:** KING GEORGE COUNTY SERVICE AUTHORITY

*Who will be legally responsible for the wastewater treatment facilities and compliance with the permit? This may or may not be the facility or property owner.*

*Who will be legally responsible for the wastewater treatment facilities and compliance with the permit? This may or may not be the facility or property owner.*

2. Is this facility located within city or town boundaries? Yes ☐ No ☒

**3. Provide the tax map parcel number for the land where the discharge is located.** 9-88B

4. For the facility to be covered by this permit, how many acres will be disturbed during the next five years due to new construction activities? zero

5. What is the design average effluent flow of this facility? 1.0 MGD

**For industrial facilities, provide the max. 30-day average production level, include units:**

**In addition to the design flow or production level, should the permit be written with limits for any other discharge flow tiers or production levels?** Yes ☒ No ☐ If "Yes", please identify the other flow tiers (in MGD) or production levels:

**0.97 MGD . The 1.0 MGD Tier is to be eliminated and Permit modified for 0.97 MGD ONLY**

Please consider the following questions for both the flow tiers and the production levels (if applicable): Do you plan to expand operations during the next five years? Is your facility's design flow considerably greater than your current flow?

**6. Nature of operations generating wastewater:**

Domestic uses, schools, and commercial – hotels, business centers, shopping center

**90** % of flow from domestic connections/sources

Number of private residences to be served by the treatment works: **2057**

**10 % of flow from non-domestic connections/sources**

7. **Mode of discharge:** ☒ Continuous ☐ Intermittent ☐ Seasonal

Describe frequency and duration of intermittent or seasonal discharges:

**8. Identify the characteristics of the receiving stream at the point just above the facility's discharge point:**

X Permanent stream, never dry

Intermittent stream, usually flowing, sometimes dry

Ephemeral stream, wet-weather flow, often dry

Effluent-dependent stream, usually or always dry without effluent flow

Lake or pond at or below the discharge point

Other:

**9. Approval Date(s)**

O &amp; M Manual May 17, 2006

Sludge/Solids Management Plan JANUARY 2005

Have there been any changes in your operations or procedures since the above approval dates? Yes ☒ No ☐

VPDES SEWAGE SLUDGE PERMIT APPLICATION FORM

SCREENING INFORMATION

This application is divided into four sections. Section A pertains to all applicants. The applicability of Sections B, C and D depends on your facility's sewage sludge use or disposal practices. The information provided on this page will help you determine which sections to fill out.

1. All applicants must complete Section A (General Information).

2. Does this facility generate sewage sludge? ☒ Yes ☐ No

Does this facility derive a material from sewage sludge? ☐ Yes ☒ No

If you answered "Yes" to either, complete Section B (Generation Of Sewage Sludge or Preparation Of A Material Derived From Sewage Sludge).

3. Does this facility apply sewage sludge to the land? ☐ Yes ☒ No

Is sewage sludge from this facility applied to the land? ☐ Yes ☒ No

If you answer "No" to all above, skip Section C.

If you answered "Yes" to either, answer the following three questions:

a. Does the sewage sludge from this facility meet the ceiling concentrations, pollutant concentrations, Class A pathogen reduction requirements and one of the vector attraction reduction requirements 1-8, as identified in the instructions?

☐ Yes ☐ No

b. Is sewage sludge from this facility placed in a bag or other container for sale or give-away for application to the land?

☐ Yes ☐ No

c. Is sewage sludge from this facility sent to another facility for treatment or blending? ☐ Yes ☐ No

If you answered "No" to all three, complete Section C (Land Application Of Bulk Sewage Sludge).

If you answered "Yes" to a, b or c, skip Section C.

4. Do you own or operate a surface disposal site? ☐ Yes ☒ No

If "Yes", complete Section D (Surface Disposal).



5. **Topographic Map.** Provide a topographic map or maps (or other appropriate maps if a topographic map is unavailable) that shows the following information. Maps should include the area one mile beyond all property boundaries of the facility

**See FIGURE 1 – TOPOGRAPHIC MAP**

- Location of all sewage sludge management facilities, including locations where sewage sludge is generated, stored, treated, or disposed.
- Location of all wells, springs, and other surface water bodies listed in public records or otherwise known to the applicant within 1/4 mile of the property boundaries.

6. **Line Drawing.** Provide a line drawing and/or a narrative description that identifies all sewage sludge processes that will be employed during the term of the permit including all processes used for collecting, dewatering, storing, or treating sewage sludge, the destination(s) of all liquids and solids leaving each unit, and all methods used for pathogen reduction and vector attraction reduction. – **See Figure 4 –PROCESS FLOW DIAGRAM**

7. **Contractor Information.** Are any operational or maintenance aspects of this facility related to sewage sludge generation, treatment, use or disposal the responsibility of a contractor? ☒ Yes ☐ No

If "Yes", provide the following for each contractor (attach additional pages if necessary).

Name: WASTE MANAGEMENT

Mailing address:

Street or P.O. Box: 45 Utah Place

City or Town: Falmouth State: VA Zip: 22485

Phone: (800) 969-2069

Contractor's Federal, State or Local Permit Number(s) applicable to this facility's sewage sludge:

**VIRGINIA Department of Environmental Quality Permit # for King George Landfill: 586**

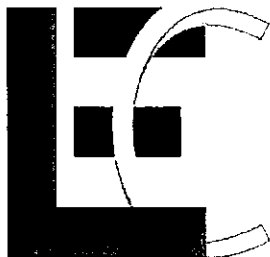
If the contractor is responsible for the use and/or disposal of the sewage sludge, provide a description of the service to be provided to the applicant and the respective obligations of the applicant and the contractor(s).

8. **Pollutant Concentrations.** Using the table below or a separate attachment, provide sewage sludge monitoring data for the pollutants which limits in sewage sludge have been established in 9 VAC 25-31-10 et seq. for this facility's expected use or disposal practices. All data must be based on three or more samples taken at least one month apart and must be no more than four and one-half years old. [SEE ATTACHMENT B – BELT PRESS CAKE REPORT OF ANALYSIS]

POLLUTANT	CONCENTRATION (mg/kg dry weight)	SAMPLE DATE	ANALYTICAL METHOD	DETECTION LEVEL FOR ANALYSIS
Arsenic				
Cadmium				
Chromium				
Copper				
Lead				
Mercury				
Molybdenum				
Nickel				
Selenium				
Zinc				

SEE ATTACHMENT C –  
BELT FILTER PRESS  
SLUDGE CAKE TESTING  
NEXT PAGE





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
10357 Old Keeton Road  
Ashland, Virginia 23005-8110  
(804)550-3971  
Fax: (804)550-3826  
www.envirocompliance.com  
email: labdirector@envirocompliance.com

King George Service Authority  
Attn: Jeff Hockaday  
10459 Courthouse Drive  
King George, VA 22485

Project Name : Dahlgren WWTP  
Date Received: June 14, 2012  
Date Issued : June 29, 2012

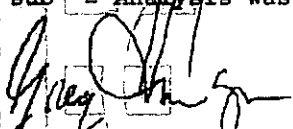
Lab # 1(A-B)/Sample ID : Beltpress sludge cake				Date/Time	Date/Time		
Sampled: June 14, 2012 10:45				Prepared	Analyzed	Method	Analyst
Parameter	Result	Units	QL				
Trichloroethene	BQL	ug/l	5.00	06-22/0830	06-22/1630	1311	ECL-H
Benzene	BQL	ug/l	5.00	06-22/0830	06-22/1630	1311	ECL-H
Tetrachloroethene	BQL	ug/l	5.00	06-22/0830	06-22/1630	1311	ECL-H
Chlorobenzene	BQL	ug/l	5.00	06-22/0830	06-22/1630	1311	ECL-H
1,4-Dichlorobenzene	BQL	ug/l	10.00	06-22/0830	06-22/1630	1311	ECL-H
Methyl ethyl ketone	BQL	ug/l	50.00	06-22/0830	06-22/1630	1311	ECL-H
PCB as Arochlor 1221	BQL	mg/kg	1.0	06-25/0830	06-25/1630	8082	ECL-H
PCB as Arochlor 1232	BQL	mg/kg	1.30	06-25/0830	06-25/1630	8082	ECL-H
PCB as Arochlor 1242	BQL	mg/kg	1.0	06-25/0830	06-25/1630	8082	ECL-H
PCB as Arochlor 1016	BQL	mg/kg	1.0	06-25/0830	06-25/1630	8082	ECL-H
PCB as Arochlor 1248	BQL	mg/kg	1.0	06-25/0830	06-25/1630	8082	ECL-H
PCB as Arochlor 1254	BQL	mg/kg	1.0	06-25/0830	06-25/1630	8082	ECL-H
PCB as Arochlor 1260	BQL	mg/kg	1.0	06-25/0830	06-25/1630	8082	ECL-H

BQL = Below Quantitation Level

All data meets NELAC requirements unless otherwise noted.

\* Sample was not analyzed within holding times.

sub\* = Analysis was sub-contracted.

  
Greg L. Hudson  
Laboratory Director

Report #: R2695930 Page 2 of 3



VELAP ID#: 460032





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
10357 Old Keeton Road  
Ashland, Virginia 23005-8110  
(804)550-3971  
Fax: (804)550-3826  
www.envirocompliance.com  
email: labdirector@envirocompliance.com

King George Service Authority  
Attn: Jeff Hockaday  
10459 Courthouse Drive  
King George, VA 22485

Project Name : Dahlgren WWT  
Date Received: June 14, 2012  
Date Issued : June 29, 2012

Lab # 1(A-B)/Sample ID : Beltpress sludge cake				Date/Time	Date/Time		
Sampled: June 14, 2012 10:45				Prepared	Analyzed	Method	Analyst
Parameter	Result	Units	QL				
Paint Filter	BQL	ml/100g	1	06-21/1005	06-21/1039	9095	ECL-H
Corrosivity	Negative	mg/kg	--	06-21/0955	06-21/0955	7.2	ECL-H
pH	5.67	SU	--	06-21/0955	06-21/0955	4500-H+B	ECL-H
TCLP Metals:						1311	
Arsenic	BQL	mg/l	.05	06-25/1000	06-25/1407	6020	ECL-H
Barium	BQL	mg/l	0.05	06-20/0935	06-27/1210	7000B	ECL-H
Cadmium	BQL	mg/l	0.05	06-25/1000	06-25/1407	6020	ECL-H
Chromium	BQL	mg/l	0.05	06-25/1000	06-25/1407	6020	ECL-H
Lead	BQL	mg/l	0.05	06-25/1000	06-25/1407	6020	ECL-H
Mercury	BQL	mg/l	.002	06-20/1300	06-20/1605	7471B	ECL-H
Selenium	BQL	mg/l	.05	06-25/1000	06-25/1407	6020	ECL-H
Silver	BQL	mg/l	.10	06-25/1000	06-25/1407	6020	ECL-H
TCLP Semi-volatiles						1311	
2,4,6-Trichlorophenol	BQL	ug/l	10.00	06-25/0830	06-25/1630	1311	ECL-H
Pentachlorophenol	BQL	ug/l	50.00	06-25/0830	06-25/1630	1311	ECL-H
o-Cresol	BQL	ug/l	10.00	06-25/0830	06-25/1630	1311	ECL-H
m-Cresol	BQL	ug/l	10.00	06-25/0830	06-25/1630	1311	ECL-H
p-Cresol	BQL	ug/l	10.00	06-25/0830	06-25/1630	1311	ECL-H
2,4,5-Trichlorophenol	BQL	ug/l	10.00	06-25/0830	06-25/1630	1311	ECL-H
Pyridine	BQL	ug/l	10.00	06-25/0830	06-25/1630	1311	ECL-H
Hexachloroethane	BQL	ug/l	10.00	06-25/0830	06-25/1630	1311	ECL-H
Nitrobenzene	BQL	ug/l	10.00	06-25/0830	06-25/1630	1311	ECL-H
Hexachlorobutadiene	BQL	ug/l	10.00	06-25/0830	06-25/1630	1311	ECL-H
2,4-Dinitrotoluene	BQL	ug/l	10.00	06-25/0830	06-25/1630	1311	ECL-H
Hexachlorbenzene	BQL	ug/l	10.00	06-25/0830	06-25/1630	6020	ECL-H
TCLP Volatiles						1311	
Vinyl chloride	BQL	ug/l	20.00	06-22/0830	06-22/1630	1311	ECL-H
1,1-Dichloroethene	BQL	ug/l	5.00	06-22/0830	06-22/1630	1311	ECL-H
Chloroform	BQL	ug/l	5.00	06-22/0830	06-22/1630	1311	ECL-H
1,2-Dichloroethane	BQL	ug/l	5.00	06-22/0830	06-22/1630	1311	ECL-H
Carbon tetrachloride	BQL	ug/l	5.00	06-22/0830	06-22/1630	1311	ECL-H

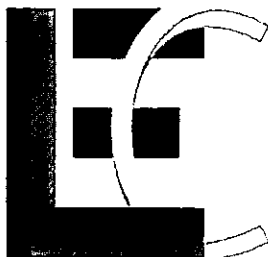
BQL = Below Quantitation Level

All data meets NELAC requirements unless otherwise noted.

\* Sample was not analyzed within holding times.

sub\* = Analysis was sub-contracted.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
10357 Old Keeton Road  
Ashland, Virginia 23005-8110  
(804)550-3971  
Fax: (804)550-3826  
www.envirocompliance.com  
email: labdirector@envirocompliance.com

King George Service Authority  
Attn: Jeff Hockaday  
10459 Courthouse Drive  
King George, VA 22485

Project Name : Dahlgren WWTP  
Date Received: August 21, 2012  
Date Issued : September 07, 2012

Lab # 1(A)/Sample ID : Sludge Cake

Sampled: August 21, 2012 11:40

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Oil and Grease	BQL	mg/l	5	09-05/1630	09-06/0945	1311/1664	ECL-H

BQL = Below Quantitation Level (Result is less than stated QL)  
All data meets NELAC requirements unless otherwise noted.

  
Greg L. Hudson  
Laboratory Director

Report #: R2896895 Page 1 of 2



VELAP ID#: 460032



9. **Certification.** Read and submit the following certification statement with this application. Refer to the instructions to determine who is an officer for purposes of this certification. Indicate which parts of the application you have completed and are submitting:

  X   Section A (General Information)

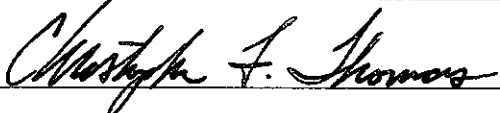
  X   Section B (Generation of Sewage Sludge or Preparation of a Material Derived from Sewage Sludge)

       Section C (Land Application of Bulk Sewage Sludge)

       Section D (Surface Disposal)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Name and official title: Christopher F. Thomas, PE, King George County Service Authority General Manager

Signature  Date Signed July 12, 2013

Telephone number: (540) 775-2746

Upon request of the department, you must submit any other information necessary to assess sewage sludge use or disposal practices at your facility or identify appropriate permitting requirements.

**SECTION B. GENERATION OF SEWAGE SLUDGE OR PREPARATION  
OF A MATERIAL DERIVED FROM SEWAGE SLUDGE**

*Complete this section if your facility generates sewage sludge or derives a material from sewage sludge*

**1. Amount Generated On Site.** (Note: sludge is combined with Sludge from other KGCSA owned Facilities at the Dahlgren wastewater treatment plant)

Total dry metric tons per 365-day period generated at your facility: 76 dry metric tons

**2. Amount Received from Off Site.** If your facility receives sewage sludge from another facility for treatment, use or disposal, provide the following information for each facility from which sewage sludge is received. If you receive sewage sludge from more than one facility, attach additional pages as necessary.

a. Facility name: Fairview Beach, Purkins Corner, Oakland Park and Hopyard Farms WWTPs

b. Contact Person: Jeff Hockaday

Title: Wastewater Manager - King George County Service Authority

Phone: (540) -775 -2746

c. Mailing address: 9207 KINGS HIGHWAY

Street or P.O. Box: N/A

City or Town: KING GEORGE State: VA Zip: 22485

d. Facility locations: Fairview Beach: 7152 Potomac Landing drive, King George | Purkins Corner: 11224 Henry Griffins Road, King George, VA | Oakland Park: 1015 French Court, Oakland Park Subdivision, King George, VA | Hopyard Farms: State Road 607, South of Intersection of State Route 3 and 607, King George, VA 22485

e. Total dry metric tons per 365-day period received from this facility: 240 dry metric tons

f. Describe, on this form or on another sheet of paper, any treatment processes known to occur at the off-site facility, including blending activities and treatment to reduce pathogens or vector attraction characteristics:

Aerobic digestion / Sludge Holding prior to hauling

**3. Treatment Provided at Your Facility.**

a. Which class of pathogen reduction is achieved for the sewage sludge at your facility?

       Class A        Class B   X   Neither or unknown

b. Describe, on this form or another sheet of paper, any treatment processes used at your facility to reduce pathogens in sewage sludge: Aerobic Digestion – prior dewatering using Belt Filter Press Disposed at the landfill

c. Which vector attraction reduction option is met for the sewage sludge at your facility?

       Option 1 (Minimum 38 percent reduction in volatile solids)

       Option 2 (Anaerobic process, with bench-scale demonstration)

       Option 3 (Aerobic process, with bench-scale demonstration)

       Option 4 (Specific oxygen uptake rate for aerobically digested sludge)

       Option 5 (Aerobic processes plus raised temperature)

       Option 6 (Raise pH to 12 and retain at 11.5)

       Option 7 (75 percent solids with no unstabilized solids)

       Option 8 (90 percent solids with unstabilized solids)

  X   None or unknown

d. Describe, on this form or another sheet of paper, any treatment processes used at your facility to reduce vector attraction properties of sewage sludge: N/A

e. Describe, on this form or another sheet of paper, any other sewage sludge treatment activities, including blending, not identified in a - d above: N/A

**4. Preparation of Sewage Sludge Meeting Ceiling and Pollutant Concentrations, Class A Pathogen Requirements and One of**

Vector Attraction Reduction Options 1-8 (EQ Sludge).

*(If sewage sludge from your facility does not meet all of these criteria, skip Question 4.)*

- a. Total dry metric tons per 365-day period of sewage sludge subject to this section that is applied to the land:

N/A \_\_\_\_\_ dry metric tons

- b. Is sewage sludge subject to this section placed in bags or other containers for sale or give-away?

\_\_\_\_ Yes \_\_\_\_ No

**5. Sale or Give-Away in a Bag or Other Container for Application to the Land.***(Complete this question if you place sewage sludge in a bag or other container for sale or give-away prior to land application. Skip this question if sewage sludge is covered in Question 4.)*

- a. Total dry metric tons per 365-day period of sewage sludge placed in a bag or other container at your facility for

sale or give-away for application to the land: N/A \_\_\_\_\_ dry metric tons

- b. Attach, with this application, a copy of all labels or notices that accompany the sewage sludge being sold or given away in a bag or other container for application to the land.

**6. Shipment Off Site for Treatment or Blending.***(Complete this question if sewage sludge from your facility is sent to another facility that provides treatment or blending. This question does not apply to sewage sludge sent directly to a land application or surface disposal site. Skip this question if the sewage sludge is covered in Questions 4 or 5. If you send sewage sludge to more than one facility, attach additional sheets as necessary.)*

- a. Receiving facility name:
- N/A

- b. Facility contact: \_\_\_\_\_

Title: \_\_\_\_\_

Phone: \_\_\_\_\_

- c. Mailing address:

Street or P.O. Box: \_\_\_\_\_

City or Town: \_\_\_\_\_ State: \_\_\_\_ Zip: \_\_\_\_\_

- d. Total dry metric tons per 365-day period of sewage sludge provided to receiving facility:

N/A \_\_\_\_\_ dry metric tons

- e. List, on this form or an attachment, the receiving facility's VPDES permit number as well as the numbers of all other federal, state or local permits that regulate the receiving facility's sewage sludge use or disposal practices:

Permit Number:

Type of Permit:

VA0026514VPDES Municipal Major

- f. Does the receiving facility provide additional treatment to reduce pathogens in sewage sludge from your facility?

X Yes \_\_\_\_ No

Which class of pathogen reduction is achieved for the sewage sludge at the receiving facility?

\_\_\_\_ Class A \_\_\_\_ Class B X Neither or unknownDescribe, on this form or another sheet of paper, any treatment processes used at the receiving facility to reduce pathogens in sewage sludge: Aerobic Digestion

- g. Does the receiving facility provide additional treatment to reduce vector attraction characteristics of the sewage sludge?
- X
- Yes \_\_\_\_ No

Which vector attraction reduction option is met for the sewage sludge at the receiving facility?

X Option 1 (Minimum 38 percent reduction in volatile solids)

\_\_\_\_ Option 2 (Anaerobic process, with bench-scale demonstration)

\_\_\_\_ Option 3 (Aerobic process, with bench-scale demonstration)

\_\_\_\_ Option 4 (Specific oxygen uptake rate for aerobically digested sludge)

\_\_\_\_ Option 5 (Aerobic processes plus raised temperature)

- ☐ Option 6 (Raise pH to 12 and retain at 11.5)  
☐ Option 7 (75 percent solids with no unstabilized solids)  
☐ Option 8 (90 percent solids with unstabilized solids)  
☐ None unknown

Describe, on this form or another sheet of paper, any treatment processes used at the receiving facility to reduce vector attraction properties of sewage sludge:

Aerobic sludge digestion in 166,784 gallon digester volume at the 1.0 MGD Dahlgren WWTP at more than 40 days retention time resulting in greater than 40% volatile solids reduction at design capacity. The Dahlgren WWTP is currently operating at 25% its design capacity.

- h. Does the receiving facility provide any additional treatment or blending not identified in f or g above?  
☐ Yes ☒ No

If "Yes", describe, on this form or another sheet of paper, the treatment processes not identified in f or g above:

- i. If you answered "Yes" to f, g or h above, attach a copy of any information you provide to the receiving facility to comply with the "notice and necessary information" requirement of 9 VAC 25-31-530.G.
- j. Does the receiving facility place sewage sludge from your facility in a bag or other container for sale or give-away for application to the land? ☐ Yes ☒ No
- If "Yes", provide a copy of all labels or notices that accompany the product being sold or given away.
- k. Will the sewage sludge be transported to the receiving facility in a truck-mounted watertight tank normally used for such purposes? ☐ Yes ☒ No. If "No", provide description and specification on the vehicle used to transport the sewage sludge to the receiving facility.

Show the haul route(s) on a location map or briefly describe the haul route below and indicate the days of the week and the times of the day sewage sludge will be transported:

**7. Land Application of Bulk Sewage Sludge. N/A**

*(Complete Question 7.a if sewage sludge from your facility is applied to the land, unless the sewage sludge is covered in Questions 4, 5 or 6. Complete Question 7.b, c & d only if you are responsible for land application of sewage sludge.)*

- a. Total dry metric tons per 365-day period of sewage sludge applied to all land application sites:  
N/A dry metric tons
- b. Do you identify all land application sites in Section C of this application? ☐ Yes ☐ No  
 If "No", submit a copy of the Land Application Plan (LAP) with this application (LAP should be prepared in accordance with the instructions).
- c. Are any land application sites located in States other than Virginia? ☐ Yes ☐ No  
 If "Yes", describe, on this form or on another sheet of paper, how you notify the permitting authority for the States where the land application sites are located. Provide a copy of the notification.

- d. Attach a copy of any information you provide to the owner or lease holder of the land application sites to comply with the "notice and necessary" information requirement of 9 VAC 25-31-530 F and/or H (Examples may be obtained in Appendix IV).

8. Surface Disposal. N/A

(Complete Question 8 if sewage sludge from your facility is placed on a surface disposal site.)

a. Total dry metric tons per 365-day period of sewage sludge from your facility placed on all surface disposal sites: N/A dry metric tons

b. Do you own or operate all surface disposal sites to which you send sewage sludge for disposal?  
☐ Yes ☐ No

If "No", answer questions c - g for each surface disposal site that you do not own or operate. If you send sewage sludge to more than one surface disposal site, attach additional pages as necessary.

c. Site name or number: N/A

d. Contact person: N/A

Title: N/A

Phone: N/A

Contact is: ☐ Site Owner ☐ Site operator

e. Mailing address:

Street or P.O. Box: N/A

f. Total dry metric tons per 365-day period of sewage sludge from your facility placed on this surface disposal site: N/A dry metric tons

g. List, on this form or an attachment, the surface disposal site VPDES permit number as well as the numbers of all other federal, state or local permits that regulate the sewage sludge use or disposal practices at the surface disposal site:

Permit Number: Type of Permit:

N/A

N/A

9. Incineration. N/A

(Complete Question 9 if sewage sludge from your facility is fired in a sewage sludge incinerator.)

a. Total dry metric tons per 365-day period of sewage sludge from your facility fired in a sewage sludge incinerator: N/A dry metric tons

b. Do you own or operate all sewage sludge incinerators in which sewage sludge from your facility is fired?  
☐ Yes ☐ No

If "No", answer questions c - g for each sewage sludge incinerator that you do not own or operate. If you send sewage sludge to more than one sewage sludge incinerator, attach additional pages as necessary.

c. Incinerator name or number: N/A

d. Contact person: N/A

Title: N/A

Phone: N/A

Contact is: ☐ Incinerator Owner ☐ Incinerator Operator

e. Mailing address:

Street or P.O. Box: N/A

City or Town: N/A

State: N/A

Zip: N/A

f. Total dry metric tons per 365-day period of sewage sludge from your facility fired in this sewage sludge incinerator: N/A dry metric tons

g. List on this form or an attachment the numbers of all other federal, state or local permits that regulate the firing



of sewage sludge at this incinerator:

Permit Number: \_\_\_\_\_ Type of Permit: \_\_\_\_\_

N/A \_\_\_\_\_

N/A \_\_\_\_\_

# 10. Disposal in a Municipal Solid Waste Landfill.

*(Complete Question 10 if sewage sludge from your facility is placed on a municipal solid waste landfill. Provide the following information for each municipal solid waste landfill on which sewage sludge from your facility is placed. If sewage sludge is placed on more than one municipal solid waste landfill, attach additional pages as necessary.)*

a. Landfill name: King George County Landfill

b. Contact person: Jeff Jenkins

Title: Director of Sludge Waste

Phone: (540) 775-3123

Contact is: ☒ Landfill Owner ☐ Landfill Operator

c. Mailing address:

Street or P.O. Box: 10459 Courthouse Road, Suite 200

City or Town: King George State: VA Zip: 22485

d. Landfill location.

Street or Route #: 10376 Bullock Drive

County: King George

City or Town: King George State: VA Zip: 22485

e. Total dry metric tons per 365-day period of sewage sludge placed in this municipal solid waste landfill:

124 dry metric tons (1,184 wet (~20% solids) tons for the period Jan 2009 – Nov 2010 – WM records)

f. List, on this form or an attachment, the numbers of all federal, state or local permits that regulate the operation of this municipal solid waste landfill:

Permit Number: \_\_\_\_\_ Type of Permit: \_\_\_\_\_

586

DEQ

5249

Waste Management Approval Code (King George Landfill)

g. Does sewage sludge meet applicable requirements in the Virginia Solid Waste Management Regulation, 9 VAC 20-80-10 et seq., concerning the quality of materials disposed in a municipal solid waste landfill?

☒ Yes ☐ No

h. Does the municipal solid waste landfill comply with all applicable criteria set forth in the Virginia Solid Waste Management Regulation, 9 VAC 20-80-10 et seq.? ☒ Yes ☐ No

i. Will the vehicle bed or other container used to transport sewage sludge to the municipal solid waste landfill be watertight and covered? ☒ Yes ☐ No

Show the haul route (s) on a location map or briefly describe the route below and indicate the days of the week and time of the day sewage sludge will be transported: See Sludge Management Plan (MAP for route, sludge is transported Mon-Fri 6 a.m. – 6 p.m.) \_\_\_\_\_

**SECTION C. LAND APPLICATION OF BULK SEWAGE SLUDGE - N/A**

*Complete this section for sewage sludge that is land applied unless any of the following conditions apply:*

- The sewage sludge meets the Table 1 ceiling concentrations, the Table 3 pollutant concentrations, Class A pathogen requirements and one of the vector attraction reduction options 1-8 (fill out B.4 instead) (EQ Sludge); or
- The sewage sludge is sold or given away in a bag or other container for application to the land (fill out B.5 instead); or
- You provide the sewage sludge to another facility for treatment or blending (fill out B.6 instead).

*Complete Section C for every site on which the sewage sludge that you reported in B.7 is land applied.*

**1. Identification of Land Application Site.**

- a. Site name or number: N/A \_\_\_\_\_
- b. Site location (Complete i and ii)
- i. Street or Route#: \_\_\_\_\_  
County: \_\_\_\_\_  
City or Town: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_
- ii. Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_  
Method of latitude/longitude determination  
\_\_\_\_ USGS map \_\_\_\_\_ Filed survey \_\_\_\_\_ Other \_\_\_\_\_
- c. Topographic map. Provide a topographic map (or other appropriate map if a topographic map is unavailable) that shows the site location.

**2. Owner Information.**

- a. Are you the owner of this land application site? \_\_\_\_\_ Yes \_\_\_\_\_ No
- b. If "No", provide the following information about the owner:  
Name: \_\_\_\_\_  
Street or P.O. Box: \_\_\_\_\_  
City or Town: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Phone: (\_\_\_\_) \_\_\_\_\_

**3. Applier Information:**

- a. Are you the person who applies, or who is responsible for application of, sewage sludge to this land application site?  
\_\_\_\_\_ Yes \_\_\_\_\_ No
- b. If "No", provide the following information for the person who applies the sewage sludge:  
Name: \_\_\_\_\_  
Street or P.O. Box: \_\_\_\_\_  
City or Town: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Phone: (\_\_\_\_) \_\_\_\_\_
- c. List, on this form or an attachment, the numbers of all federal, state or local permits that regulate the person who applies sewage sludge to this land application site:  
Permit Number: \_\_\_\_\_ Type of Permit: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**4. Site Type.** Identify the type of land application site from among the following:

\_\_\_\_ Agricultural land      \_\_\_\_ Reclamation site      \_\_\_\_ Forest  
\_\_\_\_ Public contact site      \_\_\_\_ Other (describe \_\_\_\_\_)

**5. Vector Attraction Reduction.**

Are any vector attraction reduction requirements met when sewage sludge is applied to the land application site?  
\_\_\_\_ Yes \_\_\_\_\_ No If "Yes", answer a and b.

- a. Indicate which vector attraction reduction option is met:  
 \_\_\_\_\_ Option 9 (Injection below land surface)  
 \_\_\_\_\_ Option 10 (Incorporation into soil within 6 hours)
- b. Describe, on this form or on another sheet of paper, any treatment processes used at the land application site to reduce the vector attraction properties of sewage sludge:
- \_\_\_\_\_
- \_\_\_\_\_

**6. Cumulative Loadings and Remaining Allotments.**

*(Complete Question 6 only if the sewage sludge applied to this site since July 20, 1993 is subject to the cumulative pollutant loading rates (CPLRs) - see instructions.)*

- a. Have you contacted DEQ or the permitting authority in the state where the sewage sludge subject to the CPLRs will be applied to ascertain whether bulk sewage sludge subject to the CPLRs has been applied to this site since July 20, 1993? \_\_\_\_\_ Yes \_\_\_\_\_ No

If "No", sewage sludge subject to the CPLRs may not be applied to this site.

If "Yes", provide the following information:

Permitting authority: \_\_\_\_\_

Contact person: \_\_\_\_\_

Phone: (\_\_\_\_\_) \_\_\_\_\_

- b. Based upon this inquiry, has bulk sewage sludge subject to the CPLRs been applied to this site since July 20, 1993? \_\_\_\_\_ Yes \_\_\_\_\_ No If "No", skip the rest of Question 6. If "Yes", answer questions c - e.

- c. Site size, in hectares: \_\_\_\_\_ (one hectare = 2.471 acres)

- d. Provide the following information for every facility other than yours that is sending or has sent sewage sludge subject to the CPLRs to this site since July 20, 1993. If more than one such facility sends sewage sludge to this site, attach additional pages as necessary.

Facility name: \_\_\_\_\_

Facility contact: \_\_\_\_\_

Title: \_\_\_\_\_

Phone: (\_\_\_\_\_) \_\_\_\_\_

Mailing address.

Street or P.O. Box: \_\_\_\_\_

City or Town: \_\_\_\_\_

State: \_\_\_\_\_

Zip: \_\_\_\_\_

- e. Provide the total loading and allotment remaining, in kg/hectare, for each of the following pollutants:

	Cumulative loading	Allotment remaining
Arsenic	_____	_____
Cadmium	_____	_____
Copper	_____	_____
Lead	_____	_____
Mercury	_____	_____
Nickel	_____	_____
Selenium	_____	_____
Zinc	_____	_____

*Complete Questions 7-12 below only if you apply sewage sludge, or you are responsible for land application of sewage sludge. Information required by these questions may be prepared as attachments to this form. Skip the following questions if you contract land application to someone else (as indicated under Section A.7) who is responsible for the operation.*

**7. Sludge Characterization.** Use the table below or a separate attachment, provide at least one analysis for each parameter.

PCBs (mg/kg)	_____
pH (S. U.)	_____
Percent Solids (%)	_____
Ammonium Nitrogen (mg/kg)	_____
Nitrate Nitrogen (mg/kg)	_____
Total Kjeldahl Nitrogen (mg/kg)	_____
Total Phosphorus (mg/kg)	_____
Total Potassium (mg/kg)	_____
Alkalinity as CaCO <sub>3</sub> * (mg/kg)	_____

\* Lime treated sludge (10% or more lime by dry weight) should be analyzed for percent CaCO<sub>3</sub>.

**8. Storage Requirements.**

Existing and proposed sludge storage facilities must provide an estimated annual sludge balance on a monthly basis incorporating such factors as storage capacity, sludge production and land application schedule. Include pertinent calculations justifying storage requirements.

Proposed sludge storage facilities must also provide the following information:

- a. A sludge storage site layout on a 7.5 minute topographic quadrangle or other appropriate scaled map to show the following topographic features of the surrounding landscape to a distance of 0.25 mile. Clearly mark the property line.
  - 1) Water wells, abandoned or operating
  - 2) Surface waters
  - 3) Springs
  - 4) Public water supply(s)
  - 5) Sinkholes
  - 6) Underground and/or surface mines
  - 7) Mine pool (or other) surface water discharge points
  - 8) Mining spoil piles and mine dumps
  - 9) Quarry(s)
  - 10) Sand and gravel pits
  - 11) Gas and oil wells
  - 12) Diversion ditch(s)
  - 13) Agricultural drainage ditch(s)
  - 14) Occupied dwellings, including industrial and commercial establishments
  - 15) Landfills or dumps
  - 16) Other unlined impoundments
  - 17) Septic tanks and drainfields
  - 18) Injection wells
  - 19) Rock outcrops
- b. A topographic map of sufficient detail to clearly show the following information:
  - 1) Maximum and minimum percent slopes
  - 2) Depressions on the site that may collect water
  - 3) Drainageways that may attribute to rainfall run-on to or runoff from this site
  - 4) Portions of the site (if any) which are located with the 100-year floodplain and how the storage facility will be protected from flooding
- c. Data and specifications for the storage facility lining material.
- d. Plan and cross-sectional views of the storage facility.
- e. Depth from the bottom of the storage facility to the seasonal high water table and separation distance to the permanent water table.

**9. Land Area Requirements.** Provide calculations justifying the land area requirements for land application of sewage sludge taking into consideration average soil productivity group, crop(s) to be grown and most limiting factor(s) of the sewage sludge, specifically Plant Available Nitrogen (PAN), Calcium Carbonate Equivalence (CCE), and metal loadings

(CPLR sewage sludge only), where applicable. Relate PAN, CCE, and metal loadings to demonstrate the most limiting factor for land application.

- 10. Landowner Agreement Forms.** Provide a properly completed Sewage Sludge Application Agreement Form (attached) for each landowner if sewage sludge is to be applied onto land not owned by the applicant.

**11. Ground Water Monitoring.**

Are any ground water monitoring data available for this land application site? ☐ Yes ☐ No

If "Yes", submit the ground water monitoring data with this permit application. Also submit a written description of the well locations, approximate depth to ground water, and the ground water monitoring procedures used to obtain these data.

**12. Land Application Site Information.**

*(Complete Items a-d for sites receiving infrequent application - land application of sewage sludge up to the agronomic rate at a frequency of once in a 3 year period; complete Items a-h for sites receiving frequent application - land application of sewage sludge in excess of 70% the agronomic rate at a frequency greater than once in a 3 year period)*

- a. Provide a general location map for each county which clearly indicates the location of all the land application sites.
- b. For each land application site provide a site plan of sufficient detail to clearly show the concerned landscape features and associated buffer zones (See instructions). Provide a legend for each landscape feature and the net acreage for each field taking into account the proposed buffer zones.
- c. In order to ensure that land application of bulk sewage sludge will not impact federally listed threatened or endangered species or federally designated critical habitat, the applicant must notify the field office of the U. S. Department of the Interior, Fish and Wildlife Service (FWS), by a letter, the proposed land application activities with the identification of the land application sites. The address and phone number of FWS are provided below.

U.S. Fish and Wildlife Service  
Virginia Field Office  
P.O. Box 480  
White Marsh, VA 23183  
TEL: (804) 693-6694

Provide a copy of the notification letter with this application form.

- d. Provide a soil survey map, preferably photographically based, with the field boundaries clearly marked. (A USDA-SCS soil survey map should be provided, if available.)

Provide a detailed legend for each soil survey map which uses accepted USDA-SCS descriptions of the typifying pedon for each soil series (soil type). Complex associations may be described as a range of characteristics. Soil descriptions shall include as a minimum the following information.

- 1) Soil symbol
- 2) Soil series, textural phase and slope range
- 3) Depth to seasonal high water table
- 4) Depth to bedrock
- 5) Estimated soil productivity group (for the proposed crop rotation)

**Item e - h are required for sites receiving frequent application of sewage sludge**

- e. In order to verify the information provided in item d, characterize the soil at each land application site. Representative soil borings or test pits to a depth of five feet or to bedrock if shallower, are to be coordinated for the typifying pedon of each soil series (soil type). Soil descriptions shall include as a minimum the following information:

- 1) Soil symbol
- 2) Soil series, textural phase and slope range
- 3) Depth to seasonal high water table
- 4) Depth to bedrock
- 5) Estimated soil productivity group (for the proposed crop rotation)

- f. Collect and analyze soil samples from each field, weighted to best represent each of the soil borings performed for Item e. Using the table below or a separate attachment, provide at least one analysis per sample for each of the following parameters.

Soil Organic Matter (%)

\_\_\_\_\_

Soil pH (std. units)

\_\_\_\_\_

Cation Exchange Capacity (meq/100g)	_____
Total Nitrogen (ppm)	_____
Organic Nitrogen (ppm)	_____
Ammonia Nitrogen (ppm)	_____
Nitrate Nitrogen (ppm)	_____
Available Phosphorus (ppm)	_____
Exchangeable Potassium (mg/100g)	_____
Exchangeable Sodium (mg/100g)	_____
Exchangeable Calcium (mg/100g)	_____
Exchangeable Magnesium (mg/100g)	_____
Arsenic (ppm)	_____
Cadmium (ppm)	_____
Copper (ppm)	_____
Lead (ppm)	_____
Mercury (ppm)	_____
Molybdenum (ppm)	_____
Nickel (ppm)	_____
Selenium (ppm)	_____
Zinc (ppm)	_____
Manganese (ppm)	_____
Particle Size Analysis or USDA Textural Estimate (%)	_____

- g. Relate the crop nutrient needs to anticipated yields, soil productivity rating and the various fertilizer or nutrient sources from sludge and chemical fertilizers. Describe any specialized agronomic management practices which may be required as a result of high soil pH. If the sludge is expected to possess an unusually high CCE or other unusual properties, provide a description of any plant tissue testing, supplemental fertilization or intensive agronomic management practices which may be necessary.
- h. Using a narrative format and referencing any related charts, describe the proposed cropping system. Show how the crop rotation and management will be coordinated with the design of the land application system. Include any supplemental fertilization program, soil testing and the coordination of tillage practices, planting and harvesting schedules and timing of land application.

SEWAGE SLUDGE APPLICATION AGREEMENT - N/A

This sewage sludge application agreement is made on this date \_\_\_\_\_ between \_\_\_\_\_, referred to here as "landowner", and \_\_\_\_\_, referred to here as the "Permittee".

Landowner is the owner of agricultural land shown on the map attached as Exhibit A and designated there as \_\_\_\_\_ ("landowner's land"). Permittee agrees to apply and landowner agrees to comply with certain permit requirements following application of sewage sludge on landowner's land in amounts and in a manner authorized by VPDES permit number \_\_\_\_\_ which is held by the Permittee.

Landowner acknowledges that the appropriate application of sewage sludge will be beneficial in providing fertilizer and soil conditioning to the property. Moreover, landowner acknowledges having been expressly advised that, in order to protect public health, the following site restrictions must be adhered to when sewage sludge receives Class B treatment for pathogen reduction:

1. Food crops with harvested parts that touch the sewage sludge/soil mixture and are totally above the land surface shall not be harvested for 14 months after application of sewage sludge;
2. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of sewage sludge when the sewage sludge remains on the land surface for four months or longer prior to incorporation into the soil;
3. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of sewage sludge when the sewage sludge remains on the land surface for less than four months prior to incorporation into the soil;
4. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of sewage sludge;
5. Animals shall not be grazed on the land for 30 days after application of sewage sludge;
6. Turf grown on land where sewage sludge is applied shall not be harvested for one year after application of the sewage sludge when the harvested turf is placed on either land with a high potential for public exposure or a lawn, unless otherwise specified by the State Water Control Board;
7. Public access to land with a high potential for public exposure shall be restricted for one year after application of sewage sludge;
8. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of sewage sludge.
9. Tobacco, because it has been shown to accumulate cadmium, should not be grown on landowner's land for three years following the application of sewage sludge borne cadmium equal to or exceeding 0.5 kilograms/hectare (0.45 pounds/acre).

Permittee agrees to notify landowner or landowner's designee of the proposed schedule for sewage sludge application and specifically prior to any particular application to landowner's land. This agreement may be terminated by either party upon written notice to the address specified below.

Landowner:

Permittee:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Mailing Address

\_\_\_\_\_  
Mailing Address

## SECTION D. SURFACE DISPOSAL – N/A

Complete this section only if you own or operate a surface disposal site. Provide the information for each active sewage sludge unit.

## 1. Information on Active Sewage Sludge Units.

- a. Unit name or number: N/A \_\_\_\_\_
- b. Unit location
- i. Street or Route#: \_\_\_\_\_  
County: \_\_\_\_\_  
City or Town: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_
- ii. Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_  
Method of latitude/longitude determination  
\_\_\_\_\_ USGS map \_\_\_\_\_ Filed survey \_\_\_\_\_ Other \_\_\_\_\_
- c. Topographic map. Provide a topographic map (or other appropriate map if a topographic map is unavailable) that shows the site location.
- d. Total dry metric tons of sewage sludge placed on the active sewage sludge unit per 365-day period:  
\_\_\_\_\_ dry metric tons.
- e. Total dry metric tons of sewage sludge placed on the active sewage sludge unit over the life of the unit:  
\_\_\_\_\_ dry metric tons.
- f. Does the active sewage sludge unit have a liner with a minimum hydraulic conductivity of  $1 \times 10^{-7}$  cm/sec?  
\_\_\_\_\_ Yes \_\_\_\_\_ No If "Yes", describe the liner or attach a description.  
\_\_\_\_\_  
\_\_\_\_\_
- g. Does the active sewage sludge unit have a leachate collection system? \_\_\_\_\_ Yes \_\_\_\_\_ No  
If "Yes", describe the leachate collection system or attach a description. Also, describe the method used for leachate disposal and provide the numbers of any federal, state or local permits for leachate disposal:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- h. If you answered "No" to either f or g, answer the following:  
Is the boundary of the active sewage sludge unit less than 150 meters from the property line of the surface disposal site? \_\_\_\_\_ Yes \_\_\_\_\_ No If "Yes", provide the actual distance in meters: \_\_\_\_\_
- i. Remaining capacity of active sewage sludge unit, in dry metric tons: \_\_\_\_\_ dry metric tons  
Anticipated closure date for active sewage sludge unit, if known: \_\_\_\_\_ (MM/DD/YYYY)  
Provide with this application a copy of any closure plan developed for this active sewage sludge unit.

## 2. Sewage Sludge from Other Facilities.

Is sewage sludge sent to this active sewage sludge unit from any facilities other than yours? \_\_\_\_\_ Yes \_\_\_\_\_ No  
If "Yes", provide the following information for each such facility, attach additional sheets as necessary.

- a. Facility name: \_\_\_\_\_
- b. Facility contact: \_\_\_\_\_  
Title: \_\_\_\_\_  
Phone: (\_\_\_\_\_) \_\_\_\_\_
- c. Mailing address:  
Street or P.O. Box: \_\_\_\_\_  
City or Town: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_



- d. List, on this form or an attachment, the facility's VPDES permit number as well as the numbers of all other federal, state or local permits that regulate the facility's sewage sludge management practices:

Permit Number: \_\_\_\_\_ Type of Permit: \_\_\_\_\_

\_\_\_\_\_

- e. Which class of pathogen reduction is achieved before sewage sludge leaves the other facility?  
\_\_\_\_\_ Class A \_\_\_\_\_ Class B \_\_\_\_\_ Neither or unknown

- f. Describe, on this form or on another sheet of paper, any treatment processes used at the other facility to reduce pathogens in sewage sludge: \_\_\_\_\_

\_\_\_\_\_

- g. Which vector attraction reduction option is achieved before sewage sludge leaves the other facility?

\_\_\_\_\_ Option 1 (Minimum 38 percent reduction in volatile solids)  
\_\_\_\_\_ Option 2 (Anaerobic process, with bench-scale demonstration)  
\_\_\_\_\_ Option 3 (Aerobic process, with bench-scale demonstration)  
\_\_\_\_\_ Option 4 (Specific oxygen uptake rate for aerobically digested sludge)  
\_\_\_\_\_ Option 5 (Aerobic processes plus raised temperature)  
\_\_\_\_\_ Option 6 (Raise pH to 12 and retain at 11.5)  
\_\_\_\_\_ Option 7 (75 percent solids with no unstabilized solids)  
\_\_\_\_\_ Option 8 (90 percent solids with unstabilized solids)  
\_\_\_\_\_ None or unknown

- h. Describe, on this form or another sheet of paper, any treatment processes used at the other facility to reduce vector attraction properties of sewage sludge: \_\_\_\_\_

\_\_\_\_\_

- i. Describe, on this form or another sheet of paper, any other sewage sludge treatment activities performed by the other facility that are not identified in e - h above: \_\_\_\_\_

\_\_\_\_\_

**3. Vector Attraction Reduction.**

- a. Which vector attraction reduction option, if any, is met when sewage sludge is placed on this active sewage sludge unit?

\_\_\_\_\_ Option 9 (Injection below land surface)  
\_\_\_\_\_ Option 10 (Incorporation into soil within 6 hours)  
\_\_\_\_\_ Option 11 (Covering active sewage sludge unit daily)

- b. Describe, on this form or another sheet of paper, any treatment processes used at the active sewage sludge unit to reduce vector attraction properties of sewage sludge: \_\_\_\_\_

\_\_\_\_\_

**4. Ground Water Monitoring.**

- a. Is ground water monitoring currently conducted at this active sewage sludge unit or are ground water monitoring data otherwise available for this active sewage sludge unit? \_\_\_\_\_ Yes \_\_\_\_\_ No

If "Yes", provide a copy of available ground water monitoring data. Also provide a written description of the well locations, the approximate depth to ground water, and the ground water monitoring procedures used to obtain these

data.

- b. Has a ground water monitoring program been prepared for this active sewage sludge unit?  
\_\_\_\_\_ Yes \_\_\_\_\_ No If "Yes", submit a copy of the ground water monitoring program with this application.
- c. Have you obtained a certification from a qualified ground water scientist that the aquifer below the active sewage sludge unit has not been contaminated? \_\_\_\_\_ Yes \_\_\_\_\_ No

If "Yes", submit a copy of the certification with this application.

**5. Site-Specific Limits.**

Are you seeking site-specific pollutant limits for the sewage sludge placed on the active sewage sludge unit?

\_\_\_\_\_ Yes \_\_\_\_\_ No If "Yes", submit information to support the request for site-specific pollutant limits with this application.

## PUBLIC NOTICE BILLING INFORMATION

I hereby authorize the Department of Environmental Quality to have the cost of publishing a public notice billed to the Agent/Department shown below. The public notice will be published once a week for two consecutive weeks in *the Free Lance Star* in accordance with 9 VAC25-31-290.C.2

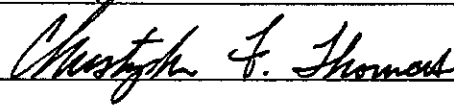
Agent/Department to be billed: King George County Service Authority

Owner: King George County Service Authority

Agent/Department Address: 9207 Kings Highway  
King George, VA 22485

Agent's Telephone No.: (540) 775-2746

Printed Name: Christopher F. Thomas, PE

Authorizing Agent – Signature: 

Date: July 12, 2013

VPDES Permit No.: VA0026514

Facility Name: DAHLGREN WASTEWATER TREATMENT PLANT



## James R. Reed & Associates

### Environmental Testing

770 Pilot House Drive • Newport News, Virginia 23606  
(757) 873-4703 • Fax 873-1498

#### Memorandum

Date: May 25, 2012

To: Jeff Hockaday, King George County

From: Lei Dong, Reed and Associates

Re: Toxicity testing for outfall 001

RECEIVED

JUN 5 2012

KGCSA

Attached is the bioassay report for outfall 001. The result passed the requirement of your permit for:

Chronic *A.bahia* Toxicity Test: NOEC=4% effluent (TUc=25)

Chronic *C.variegatus* Toxicity Test: NOEC=100% effluent (TUc=1)

If you have any questions and comments, please call me.



May 25, 2012

DAHLGREN WWTP

Sample ID: 001  
NPDES#: VA0026514  
JRA ID: 12-07496

Chronic *Americamysis bahia* Survival, Growth and Fecundity Test  
Chronic *Cyprinodon variegatus* Survival and Growth Test

Performed for:

Jeff Hockaday  
King George County  
10459 Courthouse Drive, Suite 201  
King George, VA 22485

Performed by:

James R. Reed & Associates  
770 Pilot House Drive  
Newport News, VA 23606

Respectfully,

A handwritten signature in cursive script, appearing to read "Elaine Claiborne", written over a horizontal line.

Elaine Claiborne  
Laboratory Director

Reproduction of this report is not permitted, except in full, without written approval from James R. Reed & Associates.  
The results of this report relate only to the sample(s) provided for analysis.  
Results conform to NELAC standards, where applicable, unless otherwise indicated.

VELAP# 460013  
EPA# VA00015



**TEST SUMMARY SHEET**  
**(For Marine and Freshwater Tests)**  
**Test Method: EPA 1007.0**

Facility: KGSA-DAHLGREN WASTEWATER PLANT NPDES Permit #: VA0026514

Outfall/Receiving Stream: Outfall 001 JRA #: 12-07496

Test Period for Which Data is Being Submitted: Annual test  
(i.e., first quarter, semiannual, or annual)

**SUMMARY OF TEST CONDITIONS**

Test Start: 5/15/2012 1125  
Date Time  
Test End: 5/22/2012 1120  
Date Time  
Test Type (chronic/acute): Chronic  
Test Organism: Americamysis bahia\* Age: 7 days  
Old name: Mysidopsis bahia  
Test Chamber Size: 250 mL  
Volume of Test Solution per Chamber: 150 mL  
Diluent: 20ppt Forty Fathoms  
Aeration Period (if necessary): None  
Test Photoperiod: 16 hours light / 8 hours dark (50-100 ft-c)

**RANGE OF CHEMICAL PARAMETERS**

Parameter	Effluent	Diluent
1. <u>Chlorine (mg/L)</u>	<u>&lt;0.02</u>	<u>&lt;0.02</u>
Initial		
Adjusted	<u>N/A</u>	
2. <u>Salinity (ppt)</u>		
Initial	<u>&lt;1</u>	<u>20-21</u>
Adjusted	<u>20</u>	
3. <u>pH</u>		
Initial	<u>8.10-8.22</u>	<u>7.60-8.43</u>
Adjusted	<u>N/A</u>	

JRA #: 12-07496 Test Type&Organism: Chronic *Americamysis bahia*

**RANGE OF CHEMICAL PARAMETERS (Continued):**

Parameter	Effluent	Diluent
4. <u>Alkalinity (mg/L as CaCO<sub>3</sub>)</u>	<u>94-106 (w/initial salinity)</u>	<u>N/A</u>
5. <u>Nitrite (mg/L)</u>	<u>0.2</u>	<u>&lt;0.2</u>
6. <u>Ammonia (mg/L)</u>	<u>0.8</u>	<u>0.8</u>
7. <u>Hardness (mg/L as CaCO<sub>3</sub>)</u>	<u>32-36 (w/initial salinity)</u>	<u>N/A</u>
8. <u>Conductivity (µmhos/cm)</u>	<u>N/A</u>	<u>N/A</u>
9. <u>DO (mg/L)</u>	<u>5.9-7.3</u>	<u>5.8-7.2</u>
10. <u>Methods Used for Adjustment of Test Solutions</u>		

Chlorine	<u>N/A</u>
Salinity	<u>Forty Fathoms</u>
pH	<u>N/A</u>

**TEST RESULTS**

1. Test Acceptability

Control Survival (%)	<u>100%</u>
Average Weight per Control Organism (mg)	<u>0.305</u>
Average Number of Young per Control ( <i>C. dubia</i> )	<u>N/A</u>
60% of Control Females ( <i>C. dubia</i> ) with 3 Broods?	<u>N/A</u>
Total Number of Male <i>C. dubia</i> in the Test	<u>N/A</u>
Known Parentage? <u>N/A</u>	
Percent Females Producing Eggs ( <i>M. bahia</i> )	<u>0%</u>

2. Method(s) of Statistical Analyses

Survival:	<u>Steel's Many-One Rank Test</u>
Growth:	<u>Dunnett's Test</u>
IC25:	<u>Linear Interpolation</u>
LC50 (at 48 hours):	<u>Visual observation</u>

JRA #: 12-07496 Test Type&Organism: 'Chronic *Americamysis bahia*

### TEST RESULTS (Continued)

#### 3. Statistical Results (as appropriate)

LC50 ( at 48 hours):	>100%		
TUa	<1		
IC25	52.1%		
Survival	(NOEC) 46%	(LOEC) 100%	
	Normal Distribution (yes/no)	no	
	Homogeneous Variance (yes/no)	N/A	
Fecundity	(NOEC) N/A	(LOEC) N/A	
	Normal Distribution (yes/no)	N/A	
	Homogeneous Variance (yes/no)	N/A	
Growth	(NOEC) 4%	(LOEC) 10%	
	Normal Distribution (yes/no)	yes	
	Homogeneous Variance (yes/no)	yes	
PMSD	12.4%		
TUc	25		
Reference Toxicant Test Date	5/15/2012		
ID No.	M1098		
Result (mg/L)	10		
QC Range (mg/L)	2.5	thru	10

4. <u>Equipment</u>	(Make	Model	Serial #	Probe #)
pH meter	VWR	SB21	00005173	F1
DO meter	YSI	5000	97JO177	N
SCT meter	Orion	3 Star	000642	A1
Temperature	VWR	digi-thermo	N/A	N/A
Chlorine	HACH	Colorimeter <sup>TM</sup> II	00000994	N/A

#### 5. Protocol Deviations/Comments

Fecundity was not used as a criterion of effect due to less than 50% egg production in control females.

---

---

---

---

---

---

---

---

---

---



**EFFLUENT USE SHEET  
(CHRONIC RENEWALS)**

Facility: KGSA-DAHLGREN WASTEWATER PLANT VPDES Permit #: VA0026514

Outfall/Receiving Stream: Outfall 001 JRA #: 12-07496

Test/Organism: 'Chronic *Americanysis bahia*

SAMPLE COLLECTION						
Date(s)		Time(s)		SAMPLE USE		
From:	To:	From:	To:	Date(s)	Time(s)	Test Day
5/14/2012	5/15/2012	0600	0600	5/15/2012	1125	0
				5/16/2012	0925	1
				5/17/2012	0945	2
5/16/2012	5/17/2012	0600	0600	5/18/2012	0940	3
				5/19/2012	0945	4
5/18/2012	5/19/2012	0600	0600	5/20/2012	0940	5
				5/21/2012	1000	6

The first use of a sample must be within 36-hours of retrieval from the sample collection device.  
Last use of sample must be within 72 hours of first use.

**TEST SUMMARY SHEET**  
**(For Marine and Freshwater Tests)**

**Test Method: EPA 1004.0**

Facility: KCSA-DAHLGREN WASTEWATER PLANT NPDES Permit #: VA0026514

Outfall/Receiving Stream: Outfall 001 JRA #: 12-07496

Test Period for Which Data is Being Submitted: Annual test  
(i.e., first quarter, semiannual, or annual)

**SUMMARY OF TEST CONDITIONS**

Test Start:	<u>Date</u> <u>5/16/2012</u>	<u>Time</u> <u>0950</u>
Test End:	<u>5/23/2012</u>	<u>0915</u>
Test Type (chronic/acute):	<u>Chronic</u>	
Test Organism:	<u>Cyprinodon variegatus</u>	Age: <u>24-48 hours</u>
Test Chamber Size:	<u>500 mL</u>	
Volume of Test Solution per Chamber:	<u>250 mL</u>	
Diluent:	<u>20ppt Forty Fathoms</u>	
Aeration Period (if necessary):	<u>none</u>	
Test Photoperiod:	<u>16 hours light / 8 hours dark (50-100 ft-c)</u>	

**RANGE OF CHEMICAL PARAMETERS**

Parameter	Effluent	Diluent
1. <u>Chlorine (mg/L)</u>		
Initial	<u>&lt;0.02</u>	<u>&lt;0.02</u>
Adjusted	<u>N/A</u>	
2. <u>Salinity (ppt)</u>		
Initial	<u>&lt;1</u>	<u>20-21</u>
Adjusted	<u>20</u>	
3. <u>pH</u>		
Initial	<u>7.83-8.17</u>	<u>7.30-8.43</u>
Adjusted	<u>N/A</u>	

JRA #: 12-07496 Test Type&Organism: Chronic *Cyprinodon variegatus*

**RANGE OF CHEMICAL PARAMETERS (Continued):**

Parameter	Effluent	Diluent
4. <u>Alkalinity (mg/L as CaCO<sub>3</sub>)</u>	<u>94-106(w/initial salinity)</u>	<u>N/A</u>
5. <u>Ammonia (mg/L)</u>	<u>N/A</u>	<u>N/A</u>
6. <u>Hardness (mg/L as CaCO<sub>3</sub>)</u>	<u>32-36 (w/initial salinity)</u>	<u>N/A</u>
7. <u>Conductivity (µmhos/cm)</u>	<u>N/A</u>	<u>N/A</u>
8. <u>DO (mg/L)</u>	<u>5.3-7.3</u>	<u>5.7-7.2</u>

9. Methods Used for Adjustment of Test Solutions

Chlorine	<u>N/A</u>
Salinity	<u>Forty Fathoms</u>
pH	<u>N/A</u>

**TEST RESULTS**

1. Test Acceptability

Control Survival (%)	<u>100%</u>
Average Weight per Control Organism (mg)	<u>1.612</u>
Average Number of Young per Control ( <i>C. dubia</i> )	<u>N/A</u>
60% of Control Females ( <i>C. dubia</i> ) with 3 Broods?	<u>N/A</u>
Total Number of Male <i>C. dubia</i> in the Test	<u>N/A</u>
Known Parentage?	<u>N/A</u>
Percent Females Producing Eggs ( <i>M. bahia</i> )	<u>N/A</u>

2. Method(s) of Statistical Analyses

Survival:	<u>Steel's Many-One Rank Test</u>
Growth:	<u>Dunnett's Test</u>
IC25:	<u>Linear Interpolation</u>
LC50 (at 48 hours):	<u>Visual observation</u>

JRA #: 12-07496 Test Type&Organism: Chronic Cyprinodon variegatus

**TEST RESULTS (Continued)**

3. Statistical Results (as appropriate)

LC50 ( at 48 hours):	>100%		
TUa	<1		
IC25	>100%		
Survival	(NOEC) 100%	(LOEC) >100%	
Normal Distribution (yes/no)	no		
Homogeneous Variance (yes/no)	n/a		
Growth	(NOEC) 100%	(LOEC) >100%	
Normal Distribution (yes/no)	yes		
Homogeneous Variance (yes/no)	yes		
PMSD	8.12%		
TUc	1		
Reference Toxicant Test Date	5/16/2012		
ID No.	C511		
Result (mg/L)	2.0		
QC Range (mg/L)	0.5	thru	2.0

4. <u>Equipment</u>	(Make	Model	Serial #	Probe #)
pH meter	VWR	SB21	00005173	F1
DO meter	YSI	5000	9710177	N
SCT meter	Orion	3 Star	000642	A1
Temperature	VWR	digi-thermo	N/A	N/A
Chlorine	HACH	Colorimeter™II	00000994	N/A

5. Protocol Deviations/Comments

Chronic Cyprinodon variegatus test was set up on 5/16/12@0950 due to FedEx delivery error.  
The test was still initiated within 36 hours of sample holding time.

**EFFLUENT USE SHEET  
(CHRONIC RENEWALS)**

Facility: 'KGSA-DAHLGREN WASTEWATER PLANT VPDES Permit #: VA0026514

Outfall/Receiving Stream: Outfall 001 JRA #: 12-07496

Test/Organism: Chronic *Cyprindon variegatus*

SAMPLE COLLECTION						
Date(s)		Time(s)		SAMPLE USE		
From:	To:	From:	To:	Date(s)	Time(s)	Test Day
5/14/2012	5/15/2012	0600	0600	5/16/2012	0950	0
				5/17/2012	0920	1
5/16/2012	5/17/2012	0600	0600	5/18/2012	0915	2
				5/19/2012	0920	3
5/18/2012	5/19/2012	0600	0600	5/20/2012	0920	4
				5/21/2012	0930	5
				5/22/2012	1000	6

The first use of a sample must be within 36-hours of retrieval from the sample collection device.  
Last use of sample must be within 72 hours of first use.

# CUMULATIVE DATA SUMMARY

## KGSA-DAHLGREN WASTEWATER PLANT

NPDES: VA0026514

Outfall 001

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC % <i>A.baltica</i>	Vertebrate NOEC % <i>C.variegatus</i>
2/24/2009			46% TUc=2.17	100% TUc=1
6/22/2009			4% TUc=25	100% TUc=1
9/21/2009			100% TUc=1	100% TUc=1
11/30/2009			46% TUc=2.17	21% TUc=4.76
3/9/2010			46% TUc=2.17	100% TUc=1
6/22/2010			21% TUc=4.76	100% TUc=1
9/28/2010			46% TUc=2.17	100% TUc=1
11/16/2010			46% TUc=2.17	100% TUc=1
4/19/2011			46% TUc=2.17	100% TUc=1
5/16/2012			4% TUc=25	100% TUc=1



Chronic *Americamysis bahia* Survival, Growth and Fecundity Test

JRA# 12-07496

### WATER QUALITY

NPDES#: VA0026514

CLIENT: King George County

OUTFALL: 001

#### SAMPLE (PRIOR TO RENEWALS)

DATE	DAY	COLLECTION DATE/TIME	ARRIVAL DATE	TEMP (°C)	INIT pH	FINAL pH	INIT DO (mg/L)	FINAL DO (mg/L)	INIT SAL (ppt)	FINAL SAL (ppt)	INIT TRC (mg/L)	FINAL TRC (mg/L)
5/15/12	0	5/14/12 6:00 5/15/12 6:00	5/15/12	25.2	7.85	8.12	10.4	7.3	<1	20	<0.02	—
5/16/12	1	"	"	25.4	7.84	8.17	10.5	7.2	<1	20	<0.02	—
5/17/12	2	"	"	25.5	7.82	8.16	10.8	7.2	<1	20	<0.02	—
5/18/12	3	5/16/12 6:00 5/17/12 6:00	5/17/12	25.2	7.73	8.17	9.7	7.3	21	20	<0.02	—
5/19/12	4	"	"	25.2	7.73	8.17	10.6	7.3	<1	20	<0.02	—
5/20/12	5	5/18/12 6:00 5/19/12 6:00	5/19/12	25.3	7.70	8.16	9.9	7.2	<1	20	<0.02	—
5/21/12	6	"	"	25.4	7.66	8.14	10.7	7.3	<1	20	<0.02	—

DO Adjustments

Date

Method

Minutes

5/15/12 5/16/12 5/17/12 5/18/12 5/19/12 5/20/12 5/21/12  
Aerate Aerate Aerate Aerate Aerate Aerate Aerate  
15+10-25 15 20 20 20 20 20

pH Adjustments

Date

Method

Amount

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

TRC Adjustments

Date

Method

Amount

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

DILUENT Forty Fathoms

Hawaiian Marine Mix

Other

CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C)	pH	DO (mg/L)	SAL (ppt)	TRC (mg/L)
5/15/12	0	5/14/12	25.3	8.43	6.7	20	<0.02
5/16/12	1	5/15/12	25.4	8.21	6.8	21	<0.02
5/17/12	2	5/16/12	25.2	8.35	6.7	21	<0.02
5/18/12	3	5/17/12	25.2	8.38	7.2	20	<0.02
5/19/12	4	5/18/12	25.4	8.36	6.8	20	<0.02
5/20/12	5	5/18/12	25.6	8.33	6.6	20	<0.02
5/21/12	6	5/19/12	25.7	8.31	6.7	20	<0.02

Chronic *Americamysis bahia* Survival, Growth and Fecundity TestJRA# 12-07496

## GENERAL COMMENTS

NPDES#: VA0026514 CLIENT: King George County

OUTFALL: 001

SAMPLE (or highest surviving concentration)			CONTROL		FEEDINGS (TIME/INIT)	
TEST DAY	NITRITE (mg/L) END Solutions	AMMONIA (mg/L) END Solutions	NITRITE (mg/L) END Solutions	AMMONIA (mg/L) END Solutions	AM	PM
0	N/A	N/A	N/A	N/A		5/15/12 1215 K <sub>u</sub>
1	0.2	0.8	<0.2	0.8	5/16/12 735 K <sub>u</sub>	5/16/12 1210 K <sub>u</sub>
2	0.2	0.8	<0.2	0.8	5/17/12 735 K <sub>u</sub>	5/17/12 1210 K <sub>u</sub>
3	0.2	0.8	<0.2	0.8	5/18/12 735 K <sub>u</sub>	5/18/12 1200 K <sub>u</sub>
4	0.2	0.8	<0.2	0.8	5/19/12 730 K <sub>u</sub>	5/19/12 1205 K <sub>u</sub>
5	0.2	0.8	<0.2	0.8	5/20/12 730 K <sub>u</sub>	5/20/12 1230 K <sub>u</sub>
6	0.2	0.8	<0.2	0.8	5/21/12 735 K <sub>u</sub>	5/21/12 1230 K <sub>u</sub>
7	0.2	0.8	<0.2	0.8	N/A	N/A

TREATMENT PREPARATIONS CALCULATIONS							Verification of:	VERIFIED BY:	ANALYST SIGNATURES	INITIALS
Conc. (%) (circle one)	Total Volume (mL)	Stock Conc. (%) (mg/L)	Amount Stock (mL)	Amount Diluent (mL)	HARD (mg/L)	ALK (mg/L)	Treatment Preparation Calculations		J. P. B.	K <sub>u</sub>
Control	1200	100	0	1200	N/A	N/A	Number of Organisms	by		
4%	1200	100	48	1152			Statistical Analyses	Ly		
10%	1200	100	120	1080			Statistical Analyses	Ly		
21%	1200	100	252	948						
46%	1200	100	552	648					Kevin	K <sub>u</sub>
100%	1200	100	1200	0	32-36	94-106				
CALCULATIONS PERFORMED BY: <u>Ly</u>										

TEST CHAMBER SIZE: 250ml TYPE: Polystyrene VOLUME OF TEST SOLUTION: 150ml

COMMENTS:



## OBSERVATIONS

NPDES#: VA0026514 CLIENT: King George County OUTFALL: 001

ORGANISM SOURCE: *Chesapeake Culture* BATCH#: M1098 HATCH DATE: 5/7/12 @ 6500  
5/8/12 @ 0830

CONC	REP	NUMBER SURVIVING PER DAY								Females with eggs	Females without eggs	Males	Immature
		0	1	2	3	4	5	6	7				
Control	1	5	5	5	5	5	5	5	5		1111	1	
	2	5	5	5	5	5	5	5	5		1	11	11
	3	5	5	5	5	5	5	5	5		111		11
	4	5	5	5	5	5	5	5	5		11	111	
	5	5	5	5	5	5	5	5	5			1111	1
	6	5	5	5	5	5	5	5	5		1	1111	
	7	5	5	5	5	5	5	5	5		11	111	
	8	5	5	5	5	5	5	5	5			1111	
DATE 12		5/15	5/16	5/17	5/18	5/19	5/20	5/21	5/22				
TIME		1125	925	945	940	945	940	1000	1120				
INIT		km	km	km	km	km	km	km	km				

CONC	REP	NUMBER SURVIVING PER DAY								Females with eggs	Females without eggs	Males	Immature
		0	1	2	3	4	5	6	7				
4%	1	5	5	5	5	5	5	5	5				
	2	5	5	5	5	5	5	5	5				
	3	5	5	5	5	5	5	5	5				
	4	5	5	5	5	5	5	5	5				
	5	5	5	5	5	5	5	5	5				
	6	5	5	5	5	5	5	5	5				
	7	5	5	5	5	5	5	5	5				
	8	5	5	5	5	5	5	5	5				

CONC	REP	NUMBER SURVIVING PER DAY								Females with eggs	Females without eggs	Males	Immature
		0	1	2	3	4	5	6	7				
10%	1	5	5	5	5	5	5	5	5				
	2	5	5	4	4	4	4	4	4				
	3	5	5	5	5	5	5	5	5				
	4	5	5	5	5	5	5	5	5				
	5	5	5	5	5	5	5	5	5				
97.5%	6	5	5	5	5	5	5	5	5				
	7	5	5	5	5	5	5	5	5				
	8	5	5	5	5	5	5	5	5				

(Indicate comments with an \* and document on General Comments page)

OBSERVATIONS  
(Continued)

NPDES#: VA0026514 CLIENT: King George County OUTFALL: 001

CONC	REP	NUMBER SURVIVING PER DAY								Females with eggs	Females without eggs	Males	Immature
		0	1	2	3	4	5	6	7				
21%	1	5	5	5	5	5	5	5	5				
	2	5	5	5	5	5	5	5	5				
	3	5	5	5	5	5	5	5	5				
	4	5	5	5	5	5	5	5	5				
	5	5	5	5	5	5	5	5	5				
	6	5	5	5	5	5	5	5	4				
	7	5	5	6	5	5	5	5	5				
	8	5	5	5	5	5	5	5	5				
	9												
	10												

Survival: 97.5 %

CONC	REP	NUMBER SURVIVING PER DAY								Females with eggs	Females without eggs	Males	Immature
		0	1	2	3	4	5	6	7				
46%	1	5	5	5	5	5	5	5	5				
	2	5	5	5	5	5	5	5	5				
	3	5	5	5	5	5	5	5	5				
	4	5	5	5	5	5	5	5	5				
	5	5	5	5	5	5	5	5	5				
	6	5	5	5	5	5	5	5	5				
	7	5	5	5	5	5	5	5	5				
	8	5	5	5	5	5	5	5	5				
	9												
	10												

Survival: 100 %

CONC	REP	NUMBER SURVIVING PER DAY								Females with eggs	Females without eggs	Males	Immature
		0	1	2	3	4	5	6	7				
100%	1	5	5	5	5	3	2	2	1				
	2	5	5	5	5	5	4	4	4				
	3	5	5	5	4	4	4	3	3				
	4	5	5	5	4	4	3	3	3				
	5	5	5	5	5	4	3	3	2				
	6	5	5	5	5	3	3	3	3				
	7	5	5	5	5	4	3	3	2				
	8	5	5	5	5	5	4	4	4				
	9												
	10												

Survival: 55 %

(Indicate comments with an \* and document on General Comments page)

Chronic *Americamysis bahia* Survival, Growth and Fecundity Test

JRA: 12-07496

NPDS# CLIENT: King George County

OUTFALL# 001

VA0026514

## GROWTH DATA

CONC.	REP	FOIL#	FOIL WT(mg)	FOIL WT&ORG WT(mg)	WT OF ORGS(mg)	#ORGS	MEAN		
Control	A	1R	4.257	5.707	1.45	5	0.290		
	B	2R	3.830	5.46	1.630	5	0.326		
	C	3R	4.150	5.926	1.776	5	0.355	Ave. wt of surviving	
	D	4R	4.083	5.704	1.621	5	0.324	Control:(mg)	0.305
	E	5R	3.708	5.053	1.345	5	0.269		
	F	6R	4.493	6.099	1.606	5	0.321	ave. wt :	0.305
	G	7R	4.283	5.717	1.434	5	0.287		
	H	8R	3.584	4.905	1.321	5	0.264		
4%	A	9R	4.058	5.626	1.568	5	0.314		
	B	10R	3.744	5.088	1.344	5	0.269		
	C	11R	3.978	5.47	1.492	5	0.298		
	D	12R	3.823	5.176	1.353	5	0.271		
	E	13R	3.267	4.613	1.346	5	0.269		
	F	14R	4.603	5.897	1.294	5	0.259		
	G	15R	3.852	5.124	1.272	5	0.254		
	H	16R	4.81	6.075	1.265	5	0.253	ave. wt :	0.273
10%	A	17R	3.965	5.321	1.356	5	0.271		
	B	18R	5.164	6.275	1.111	5	0.222		
	C	19R	4.325	5.641	1.316	5	0.263		
	D	20R	4.081	5.368	1.287	5	0.257		
	E	21R	4.75	6.006	1.256	5	0.251		
	F	22R	5.005	6.307	1.302	5	0.260		
	G	23R	5.21	6.403	1.193	5	0.239		
	H	24R	5.2	6.002	0.802	5	0.160	ave. wt :	0.241
21%	A	25R	4.83	5.981	1.151	5	0.230		
	B	26R	3.898	5.332	1.434	5	0.287		
	C	27R	4.784	5.957	1.173	5	0.235		
	D	28R	3.575	4.834	1.259	5	0.252		
	E	29R	3.66	4.793	1.133	5	0.227		
	F	30R	4.201	5.242	1.041	5	0.208		
	G	31R	3.605	5.195	1.590	5	0.318		
	H	32R	4.29	5.300	1.010	5	0.202	ave. wt :	0.245
46%	A	33R	4.526	5.783	1.257	5	0.251		
	B	34R	5.076	6.321	1.245	5	0.249		
	C	35R	4.95	6.134	1.184	5	0.237		
	D	36R	3.912	4.999	1.087	5	0.217		
	E	37R	4.311	5.435	1.124	5	0.225		
	F	38R	4.865	6.173	1.308	5	0.262		
	G	39R	4.807	5.915	1.108	5	0.222		
	H	40R	4.217	5.400	1.183	5	0.237	ave. wt :	0.237
100%	A	41R	4.435	4.886	0.451	5	0.090		
	B	42R	4.213	5.303	1.09	5	0.218		
	C	43R	5.285	6.059	0.774	5	0.155		
	D	44R	5.525	6.397	0.872	5	0.174		
	E	45R	4.655	5.154	0.499	5	0.100		
	F	46R	5.758	6.336	0.578	5	0.116		
	G	47R	4.805	5.449	0.644	5	0.129		
	H	48R	5.651	6.487	0.836	5	0.167	ave. wt :	0.144
Date		5/17/2012	5/23/2012						
Initials		LD	LD						

Date/Time in Oven 5/22/23@1300 Analyst KH

Oven Temp°C 104

Date/Time out of Oven 5/23/12@0700 Analyst KH

Oven Temp°C 104



## PHYSICAL/CHEMICAL DATA

NPDES#: VA0026514

CLIENT: King George County

OUTFALL: 001

CONC: Control		DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
TEMP (°C)	NEW	25.3	25.4	25.2	25.2	25.4	25.6	25.7	N/A
	END	N/A	25.7	25.3	25.7	26.7	25.7	25.6	25.7
pH	NEW	8.43	8.21	8.35	8.38	8.36	8.33	8.31	N/A
	END	N/A	7.74	7.76	7.75	7.60	7.75	7.87	7.69
DO (mg/L)	NEW	6.7	6.8	6.7	7.2	6.8	6.6	6.7	N/A
	END	N/A	5.8	6.3	6.3	6.2	6.0	6.4	6.8
SALINITY (ppt)		20	21	21	20	20	20	20	N/A
DATE/TIME		5/15/12	5/16/12	5/17/12	5/18/12	5/19/12	5/20/12	5/21/12	5/22/12
INITIALS		RM	RM	RM	RM	RM	RM	RM	RM

CONC: 4%		DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
TEMP (°C)	NEW	25.3	25.4	25.2	25.1	25.4	25.3	25.7	N/A
	END	N/A	25.7	25.3	25.7	25.7	25.7	25.6	25.7
pH	NEW	8.34	8.21	8.34	8.37	8.34	8.35	8.27	N/A
	END	N/A	7.77	7.57	7.83	7.68	7.67	7.81	7.72
DO (mg/L)	NEW	6.5	6.8	6.7	7.0	6.8	6.8	6.7	N/A
	END	N/A	5.8	5.9	6.1	6.0	5.7	6.1	6.7
SALINITY (ppt)		20	21	21	20	20	20	20	N/A

CONC: 10%		DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
TEMP (°C)	NEW	25.3	25.3	25.3	25.1	25.6	25.6	25.7	N/A
	END	N/A	25.7	25.3	25.7	25.7	25.7	25.6	25.7
pH	NEW	8.32	8.21	8.32	8.36	8.31	8.33	8.26	N/A
	END	N/A	7.84	7.59	7.90	7.74	7.79	7.88	7.79
DO (mg/L)	NEW	6.7	6.7	6.6	7.0	6.7	6.8	6.6	N/A
	END	N/A	5.9	5.8	6.1	6.1	5.9	6.2	6.7
SALINITY (ppt)		20	21	21	20	20	20	20	N/A



## PHYSICAL/CHEMICAL DATA

NPDES#: VA0026514

CLIENT: King George County

OUTFALL: 001

CONC: 21%		DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
TEMP (°C)	NEW	25.3	25.3	25.2	25.2	25.6	25.6	25.7	N/A
	END	N/A	25.7	25.3	25.7	25.7	25.7	25.6	25.7
pH	NEW	8.29	8.20	8.28	8.32	8.28	8.30	8.23	N/A
	END	N/A	7.83	7.80	7.93	7.83	7.79	7.88	7.85
DO (mg/L)	NEW	6.7	6.8	6.6	6.9	6.7	6.7	6.6	N/A
	END	N/A	5.9	6.1	6.1	6.2	5.8	6.1	6.8
SALINITY (ppt)		20	21	21	20	20	20	20	N/A
DATE/TIME 2012		5/15	5/16	5/17	5/18	5/19	5/20	5/21	5/22
INITIALS		LD	RM	RM	RM	RM	RM	RM	RM

CONC: 46%		DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
TEMP (°C)	NEW	25.7	25.4	25.3	25.2	25.6	25.6	25.7	N/A
	END	N/A	25.7	25.3	25.7	25.7	25.7	25.6	25.7
pH	NEW	8.22	8.19	8.23	8.25	8.21	8.24	8.18	N/A
	END	N/A	7.96	7.91	8.04	7.98	7.94	7.97	7.96
DO (mg/L)	NEW	6.7	6.8	6.7	7.10	6.7	6.7	6.8	N/A
	END	N/A	5.9	6.0	6.0	6.1	5.9	6.1	6.7
SALINITY (ppt)		20	21	20	20	20	20	20	N/A

CONC: 100%		DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
TEMP (°C)	NEW	25.2	25.4	25.5	25.2	25.2	25.3	25.4	N/A
	END	N/A	25.7	25.3	25.7	25.7	25.7	25.6	25.7
pH	NEW	8.12	8.17	8.16	8.17	8.17	8.16	8.14	N/A
	END	N/A	8.10	8.20	8.22	8.18	8.13	8.10	8.16
DO (mg/L)	NEW	7.3	7.2	7.2	7.3	7.3	7.2	7.3	N/A
	END	N/A	5.9	6.3	6.3	6.1	6.1	6.1	6.6
SALINITY (ppt)		20	20	20	20	20	20	20	N/A

# Mysid Survival, Growth and Fecundity Test-7 Day Survival

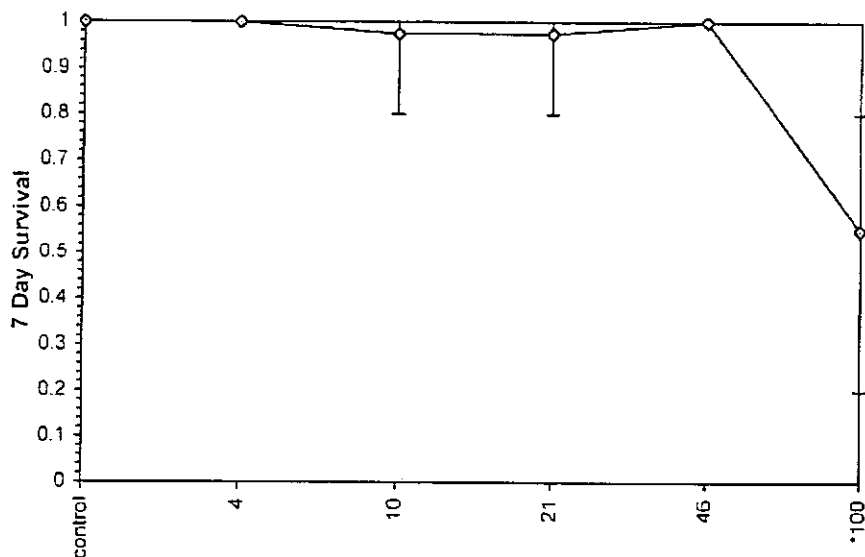
Start Date: 5/15/2012 Test ID: 12-07496MB Sample ID: 12-07496MB  
End Date: 5/22/2012 Lab ID: JRR Sample Type: EFF1-POTW  
Sample Date: Protocol: EPAM 94-EPA/600/4-91/003 Test Species: MY-Mysidopsis bahia  
Comments:

Conc.-%	1	2	3	4	5	6	7	8
control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10	1.0000	0.8000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
21	1.0000	1.0000	1.0000	1.0000	1.0000	0.8000	1.0000	1.0000
46	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100	0.2000	0.8000	0.6000	0.6000	0.4000	0.6000	0.4000	0.8000

Conc.-%	Mean	N-Mean	Transform: Arcsin Square Root					Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%	N		
control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	8		
4	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	8	68.00	46.00
10	0.9750	0.9750	1.3155	1.1071	1.3453	6.400	8	64.00	46.00
21	0.9750	0.9750	1.3155	1.1071	1.3453	6.400	8	64.00	46.00
46	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	8	68.00	46.00
*100	0.5500	0.5500	0.8382	0.4636	1.1071	26.252	8	36.00	46.00

Auxiliary Tests		Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ( $p \leq 0.05$ )		0.68102	0.947	-0.9437	6.54768
Equality of variance cannot be confirmed					
Hypothesis Test (1-tail, 0.05)		NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test		46	100	67.8233	2.17391
Treatments vs control		✓	✓		

Dose-Response Plot



### Mysid Survival, Growth and Fecundity Test-Growth-Weight

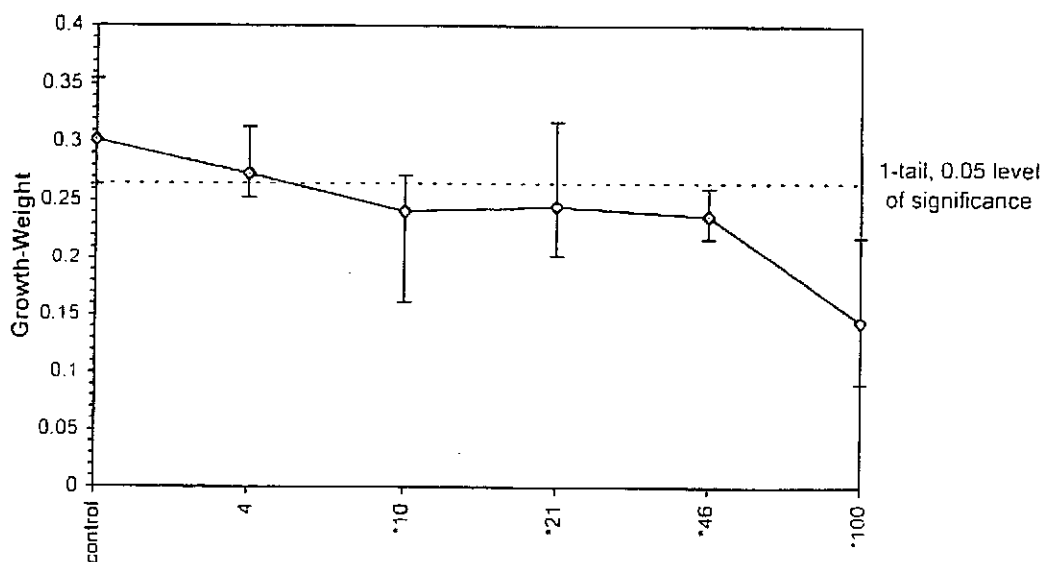
Start Date: 5/15/2012 Test ID: 12-07496MB Sample ID: 12-07496MB  
 End Date: 5/22/2012 Lab ID: JRR Sample Type: EFF1-POTW  
 Sample Date: Protocol: EPAM 94-EPA/600/4-91/003 Test Species: MY-Mysidopsis bahia  
 Comments:

Conc-%	1	2	3	4	5	6	7	8
control	0.2900	0.3260	0.3552	0.3242	0.2690	0.3032	0.2868	0.2642
4	0.3136	0.2688	0.2984	0.2706	0.2692	0.2588	0.2544	0.2530
10	0.2712	0.2222	0.2632	0.2574	0.2512	0.2604	0.2386	0.1604
21	0.2302	0.2868	0.2346	0.2518	0.2266	0.2082	0.3180	0.2020
46	0.2514	0.2490	0.2368	0.2174	0.2248	0.2616	0.2216	0.2366
100	0.0902	0.2180	0.1548	0.1744	0.0998	0.1156	0.1288	0.1672

Conc-%	Mean	N-Mean	Transform: Untransformed					t-Stat	1-Tailed	
			Mean	Min	Max	CV%	N		Critical	MSD
control	0.3023	1.0000	0.3023	0.2642	0.3552	10.304	8			
4	0.2734	0.9042	0.2734	0.2530	0.3136	7.917	8	1.776	2.306	0.0376
*10	0.2406	0.7957	0.2406	0.1604	0.2712	14.912	8	3.784	2.306	0.0376
*21	0.2448	0.8096	0.2448	0.2020	0.3180	16.188	8	3.527	2.306	0.0376
*46	0.2374	0.7852	0.2374	0.2174	0.2616	6.614	8	3.979	2.306	0.0376
*100	0.1436	0.4750	0.1436	0.0902	0.2180	29.940	8	9.727	2.306	0.0376

Auxiliary Tests					Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)					0.98264	0.947	0.14888	0.53808						
Bartlett's Test indicates equal variances (p = 0.14)					8.28838	15.0863								
Hypothesis Test (1-tail, 0.05)					NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test					4	10	6.32456	25	0.03762	0.12445	0.02291	0.00107	1.3E-10	5, 42
Treatments vs control					✓	✓								

Dose-Response Plot



### Mysid Survival, Growth and Fecundity Test-Growth-Weight

Start Date: 5/15/2012 Test ID: 12-07496MB Sample ID: 12-07496MB  
 End Date: 5/22/2012 Lab ID: JRR Sample Type: EFF1-POTW  
 Sample Date: Protocol: EPAM 94-EPA/600/4-91/003 Test Species: MY-Mysidopsis bahia  
 Comments:

Conc-%	1	2	3	4	5	6	7	8
control	0.2900	0.3260	0.3552	0.3242	0.2690	0.3032	0.2868	0.2642
4	0.3136	0.2688	0.2984	0.2706	0.2692	0.2588	0.2544	0.2530
10	0.2712	0.2222	0.2632	0.2574	0.2512	0.2604	0.2386	0.1604
21	0.2302	0.2868	0.2346	0.2518	0.2266	0.2082	0.3180	0.2020
46	0.2514	0.2490	0.2368	0.2174	0.2248	0.2616	0.2216	0.2366
100	0.0902	0.2180	0.1548	0.1744	0.0998	0.1156	0.1288	0.1672

Conc-%	Mean	N-Mean	Transform: Untransformed					N	Isotonic	
			Mean	Min	Max	CV%	Mean		N-Mean	
control	0.3023	1.0000	0.3023	0.2642	0.3552	10.304	8	0.3023	1.0000	
4	0.2734	0.9042	0.2734	0.2530	0.3136	7.917	8	0.2734	0.9042	
10	0.2406	0.7957	0.2406	0.1604	0.2712	14.912	8	0.2427	0.8027	
21	0.2448	0.8096	0.2448	0.2020	0.3180	16.188	8	0.2427	0.8027	
46	0.2374	0.7852	0.2374	0.2174	0.2616	6.614	8	0.2374	0.7852	
100	0.1436	0.4750	0.1436	0.0902	0.2180	29.940	8	0.1436	0.4750	

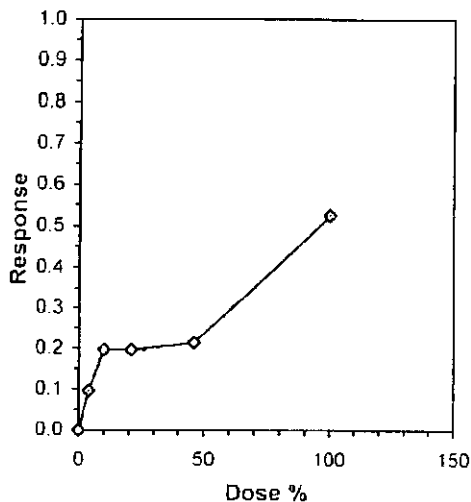
#### Auxiliary Tests

	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ( $p > 0.05$ )	0.98264	0.947	0.14888	0.53808
Bartlett's Test indicates equal variances ( $p = 0.14$ )	8.28838	15.0863		

#### Linear Interpolation (200 Resamples)

Point	%	SD	95% CL	Skew
IC05*	2.087	1.156	1.098	5.391
IC10	4.246	2.306	2.197	8.911
IC15	7.203	6.947	3.295	29.657
IC20	24.863	17.594	5.498	52.211
IC25 ✓	52.135 ✓	14.877	9.312	62.064
IC40	78.242			
IC50	95.646			

\* indicates IC estimate less than the lowest concentration

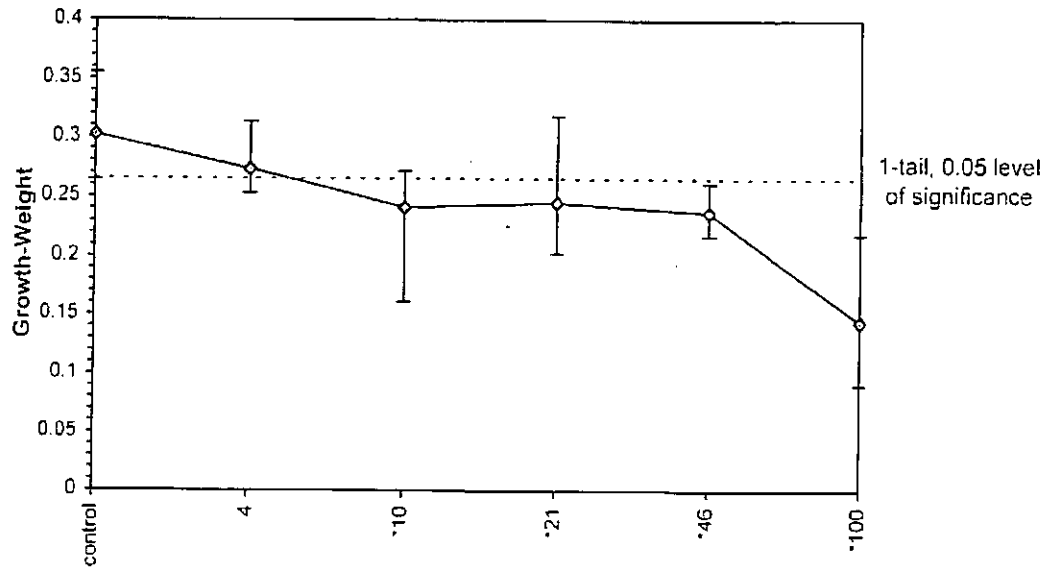




Mysid Survival, Growth and Fecundity Test-Growth-Weight

Start Date: 5/15/2012	Test ID: 12-07496MB	Sample ID: 12-07496MB
End Date: 5/22/2012	Lab ID: JRR	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAM 94-EPA/600/4-91/003	Test Species: MY-Mysidopsis bahia
Comments:		

Dose-Response Plot



Chronic *Cyprinodon variegatus* Larval Survival and Growth Test  
OBSERVATIONS

JRA# 12-07496



NPDES#: VA0026514 CLIENT: King George County OUTFALL: \_\_\_\_\_

ORGANISM SOURCE: ABS JRA BATCH #: C511 HATCH DATE: 5/14/12

NUMBER SURVIVING/DAY									
CONC	REP	DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Control	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
$\bar{x}$ SUV		100%							
4%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	9	9
	D	10	10	10	10	10	10	10	10
$\bar{x}$ SUV		97.5%							
10%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
$\bar{x}$ SUV		100%							
21%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
$\bar{x}$ SUV		100%							
45%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
$\bar{x}$ SUV		100%							
100%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
$\bar{x}$ SUV		100%							
DATE		5/16/12	5/17/12	5/18/12	5/19/12	5/20/12	5/21/12	5/22/12	5/23/12
TIME		950	920	915	920	920	930	1000	915
INIT		km	km	km	km	km	km	km	km

## Chronic C.variegatus Survival and Growth Test

JRA: 12-07496

NPDS#

CLIENT: King George County

OUTFALL# 001

VA0026514

## GROWTH DATA

CONC.	REP	FOIL#	FOIL WT(mg)	FOIL WT&ORG WT(mg)	WT OF ORGS(mg)	#ORGS	MEAN		
Control	A	1H	4.475	21.477	17.002	10	1.700		
	B	2H	3.801	20.144	16.343	10	1.634		
	C	3H	4.441	20.755	16.314	10	1.631	Ave. wt of surviving	
	D	4H	3.408	18.224	14.816	10	1.482	Control:(mg)	1.612
								ave. wt :	1.612
4%	A	5H	3.002	18.183	15.181	10	1.518		
	B	6H	3.651	18.030	14.379	10	1.438		
	C	7H	3.232	18.487	15.255	10	1.526		
	D	8H	3.338	18.844	15.506	10	1.551		
								ave. wt :	1.508
10%	A	9H	3.573	18.631	15.058	10	1.506		
	B	10H	3.936	19.212	15.276	10	1.528		
	C	11H	4.216	20.787	16.571	10	1.657		
	D	12H	4.145	19.966	15.821	10	1.582		
								ave. wt :	1.568
21%	A	13H	4.159	18.801	14.642	10	1.464		
	B	14H	3.592	17.935	14.343	10	1.434		
	C	15H	3.722	20.461	16.739	10	1.674		
	D	16H	4.683	19.696	15.013	10	1.501		
								ave. wt :	1.518
46%	A	17H	3.154	19.223	16.069	10	1.607		
	B	18H	4.568	19.576	15.008	10	1.501		
	C	19H	4.704	21.515	16.811	10	1.681		
	D	20H	4.256	20.461	16.205	10	1.621		
								ave. wt :	1.602
100%	A	21H	5.032	21.544	16.512	10	1.651		
	B	22H	4.138	20.210	16.072	10	1.607		
	C	23H	5.220	22.2	16.980	10	1.698		
	D	24H	5.326	21.094	15.768	10	1.577		
								ave. wt :	1.633
Date			5/17/2012	5/24/2012					
Initials			LD	LD					

Date/Time in Oven: 5/23/12@1030 Analyst: KH

Date/Time out of Oven: 5/24/12@0700 Analyst: KH

Oven Temp°C 104

Oven Temp°C 104



## PHYSICAL/CHEMICAL DATA

NPDES#: VA0026514 CLIENT: King George County OUTFALL:001

CONC: Control		DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
TEMP (°C)	NEW	25.3	25.2	25.2	25.4	25.6	25.7	25.3	N/A
	END	N/A	24.5	24.7	24.5	24.5	24.8	25.3	24.5
pH	NEW	8.43	8.35	8.38	8.36	8.33	8.31	8.21	N/A
	END	N/A	7.75	7.46	7.42	7.61	7.57	7.30	7.50
DO (mg/L)	NEW	6.7	6.7	7.2	6.8	6.6	6.7	6.7	N/A
	END	N/A	6.2	5.7	6.0	5.8	5.8	5.7	6.3
SALINITY (ppt)		20	21	20	20	20	20	21	N/A
DATE/TIME		5/16/12	5/17/12	5/18/12	5/19/12	5/20/12	5/21/12	5/22/12	5/23/12
INITIALS		KU	KU	KU	KU	KU	KU	KU	KU

CONC: 4%		DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
TEMP (°C)	NEW	24.4	25.2	25.1	25.4	25.3	25.7	25.3	N/A
	END	N/A	24.5	24.7	24.5	24.5	24.8	26.3	24.5
pH	NEW	8.17	8.34	8.37	8.34	8.35	8.27	8.20	N/A
	END	N/A	7.73	7.67	7.58	7.60	7.60	7.33	7.57
DO (mg/L)	NEW	7.2	6.7	7.0	6.8	6.8	6.7	6.7	N/A
	END	N/A	6.1	5.7	6.0	5.7	5.7	5.7	6.5
SALINITY (ppt)		20	21	20	20	20	20	21	N/A

CONC: 10%		DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
TEMP (°C)	NEW	24.4	25.3	25.1	25.6	25.6	25.7	25.3	N/A
	END	N/A	24.5	24.7	24.5	24.5	24.8	25.3	24.5
pH	NEW	8.18	8.32	8.36	8.31	8.33	8.26	8.19	N/A
	END	N/A	7.77	7.70	7.61	7.66	7.62	7.36	7.60
DO (mg/L)	NEW	7.2	6.6	7.0	6.7	6.8	6.6	6.7	N/A
	END	N/A	6.1	5.7	6.0	5.7	5.6	5.5	6.5
SALINITY (ppt)		20	21	20	20	20	20	21	N/A



## PHYSICAL/CHEMICAL DATA

NPDES#: VA0026514 CLIENT: King George County OUTFALL: 001

CONC: 21%		DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
TEMP (°C)	NEW	24.4	25.2	25.2	25.6	25.6	25.7	25.3	N/A
	END	N/A	24.5	24.7	24.5	24.5	24.8	25.3	24.5
pH	NEW	8.20	8.28	8.32	8.28	8.30	8.23	8.18	N/A
	END	N/A	7.83	7.76	7.70	7.72	7.70	7.46	7.71
DO (mol/L)	NEW	7.1	6.6	6.9	6.7	6.7	6.6	6.8	N/A
	END	N/A	6.0	5.7	6.0	5.8	5.7	5.5	6.6
SALINITY (ppt)		20	21	20	20	20	20	20	N/A
DATE/TIME		5/16/12	5/17/12	5/18/12	5/19	5/20	5/21	5/22	5/23
INITIALS		KM	KM	KM	KM	KM	KM	KM	KM

CONC: 46%		DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
TEMP (°C)	NEW	24.4	25.3	25.2	25.6	25.6	25.7	25.3	N/A
	END	N/A	24.5	24.7	24.5	24.5	24.8	25.3	24.5
pH	NEW	8.22	8.23	8.25	8.21	8.24	8.18	8.17	N/A
	END	N/A	7.87	7.92	7.90	7.81	7.70	7.60	7.78
DO (mol/L)	NEW	7.1	6.7	7.0	6.7	6.7	6.8	6.9	N/A
	END	N/A	5.9	5.8	6.1	5.8	5.5	5.5	6.4
SALINITY (ppt)		20	20	20	20	20	20	20	N/A

CONC: 100%		DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
TEMP (°C)	NEW	25.2	25.5	25.2	25.2	25.3	25.4	25.5	N/A
	END	N/A	24.5	24.7	24.5	24.5	24.8	25.3	24.5
pH	NEW	8.12	8.16	8.17	8.17	8.16	8.14	8.17	N/A
	END	N/A	8.07	8.05	8.05	7.97	7.83	7.85	7.93
DO (mol/L)	NEW	7.3	7.2	7.3	7.3	7.2	7.3	7.3	N/A
	END	N/A	5.9	5.7	6.0	5.7	5.3	5.4	6.2
SALINITY (ppt)		20	20	20	20	20	20	20	N/A



Chronic *Cyprinodon variegatus* Larval Survival and Growth Test

JRA# 12-07496

### GENERAL COMMENTS

NPDES#: VA0026514 CLIENT: King George County OUTFALL: 001

FEEDINGS	DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6
Date/Time		5/17/12 735 am	5/18/12 735	5/19/12 730	5/20/12 730	5/21/12 735	5/22/12 730
INITIALS			ku	ku	ku	ku	ku
Date/Time	5/16/12 1210	5/17/12 1210	5/18/12 1200	5/19/12 1205	5/20/12 1230	5/21/12 1230	5/22/12 1400
INITIALS	ku	ku	ku	ku	ku	ku	ku

TREATMENT PREPARATIONS CALCULATIONS						ANALYST SIGNATURES	INITIALS
Conc. (mg/L)	Total Volume (mL)	Stock Conc. (mg/L)	Amount Stock (mL)	Amount Diluent (mL)	Verification of	VERIFIED BY:	
Control	1000	100%	0	1000	Treatment Preparation Calculations	ky	
4%	1000	100%	40	960	Number of Organisms	ky	
10%	1000	100%	100	900	Statistical Analyses	ky	
21%	1000	100%	210	790			
46%	1000	100%	460	540			
100%	1000	100%	1000	0			

1000

ku

TEST CHAMBER SIZE: 500mL TYPE: Polystyrene VOLUME OF TEST SOLUTION: 250mL

COMMENTS: CHRONIC *Cyprinodon variegatus* test was set up on 5/16/12 @ 9:50 due to FedEx delivery error. The test was still initiated within 36 hours of sample holding time.

Chronic *Cyprinodon variegatus* Larval Survival and Growth TestJRA# 12-07496

## WATER QUALITY

NPDES#: VA0026514 CLIENT: King George County OUTFALL: 001

SAMPLE (PRIOR TO RENEWALS)													
DATE	DAY	COLLECTION DATE/TIME	ARRIVAL DATE	TEMP (°C)	INIT pH	FINAL pH	INIT DO (mg/L)	FINAL DO (mg/L)	INIT SAL (ppt)	FINAL SAL (ppt) 20±1	INIT TRC (mg/L)	FINAL TRC (mg/L)	
5/15/12	0	5/14/12 6:00 5/15/12 6:00	5/15/12	25.2	7.85	8.12	10.4	7.3	<1	20	<0.02	—	
5/17/12	1	"	"	25.5	7.82	8.16	10.8	7.2	<1	20	<0.02	—	
5/18/12	2	5/16/12 6:00 5/17/12 6:00	5/17/12	25.2	7.73	8.17	9.7	7.3	<1	20	<0.02	—	
5/19/12	3	"	"	25.2	7.73	8.17	10.6	7.3	<1	20	<0.02	—	
5/20/12	4	5/18/12 6:00 5/19/12 6:00	5/19/12	25.3	7.78	8.16	9.9	7.2	<1	20	<0.02	—	
5/21/12	5	"	"	25.4	7.66	8.14	10.7	7.3	<1	20	<0.02	—	
5/22/12	6	"	"	25.5	7.78	8.17	11.0	7.3	<1	20	<0.02	—	

DO Adjustments      Date      5/15/12 5/17/12 5/18/12 5/19/12 5/20/12 5/21/12 5/22/12  
 Method      Aerate Aerate Aerate Aerate Aerate Aerate Aerate  
 Minutes      15+10 20 20 20 20 20 20

pH Adjustments      Date      \_\_\_\_\_  
 Method      \_\_\_\_\_  
 Amount      \_\_\_\_\_

TRC Adjustments      Date      \_\_\_\_\_  
 Method      \_\_\_\_\_  
 Amount      \_\_\_\_\_

DILUENT ( <u>Fifty Fathoms</u> <input type="radio"/> Hawaiian Marine Mix <input type="radio"/> Other _____ ) CIRCLE ONE							
DATE	DAY	DATE MADE	TEMP (°C) 25±1	pH (6-9)	DO (mg/L) >60, <100%	SAL (ppt) 20±1	TRC (mg/L)
5/15/12	0	5/14/12	25.3	8.43	6.7	20	<0.02
5/17/12	1	5/16/12	25.2	8.35	6.7	21	<0.02
5/18/12	2	5/17/12	25.2	8.38	7.2	20	<0.02
5/19/12	3	5/18/12	25.4	8.26	6.8	20	<0.02
5/20/12	4	5/18/12	25.6	8.33	6.6	20	<0.02
5/21/12	5	5/19/12	25.7	8.31	6.7	20	<0.02
5/22/12	6	5/20/12	25.3	8.21	6.7	21	<0.02

# Larval Fish Growth and Survival Test-7 Day Survival

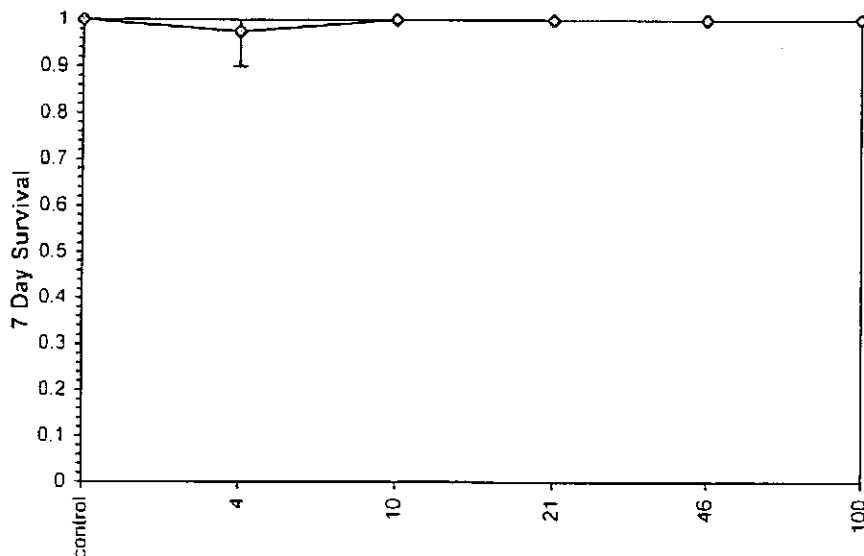
Start Date: 5/16/2012 Test ID: 1207496CV Sample ID: 1207496CV  
 End Date: 5/23/2012 Lab ID: JRR Sample Type: EFF1-POTW  
 Sample Date: Protocol: EPAM 94-EPA/600/4-91/003 Test Species: CV-Cyprinodon variegatus  
 Comments:

Conc-mg/L	1	2	3	4
control	1.0000	1.0000	1.0000	1.0000
4	1.0000	1.0000	0.9000	1.0000
10	1.0000	1.0000	1.0000	1.0000
21	1.0000	1.0000	1.0000	1.0000
46	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000

Conc-mg/L	Mean	N-Mean	Transform: Arcsin Square Root					Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%	N		
control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4		
4	0.9750	0.9750	1.3713	1.2490	1.4120	5.942	4	16.00	10.00
10	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	18.00	10.00
21	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	18.00	10.00
46	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	18.00	10.00
100	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	18.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ( $p \leq 0.05$ )	0.46508	0.916	-3.0206	13.9892
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		
Treatments vs control				

Dose-Response Plot





# Larval Fish Growth and Survival Test-7 Day Growth

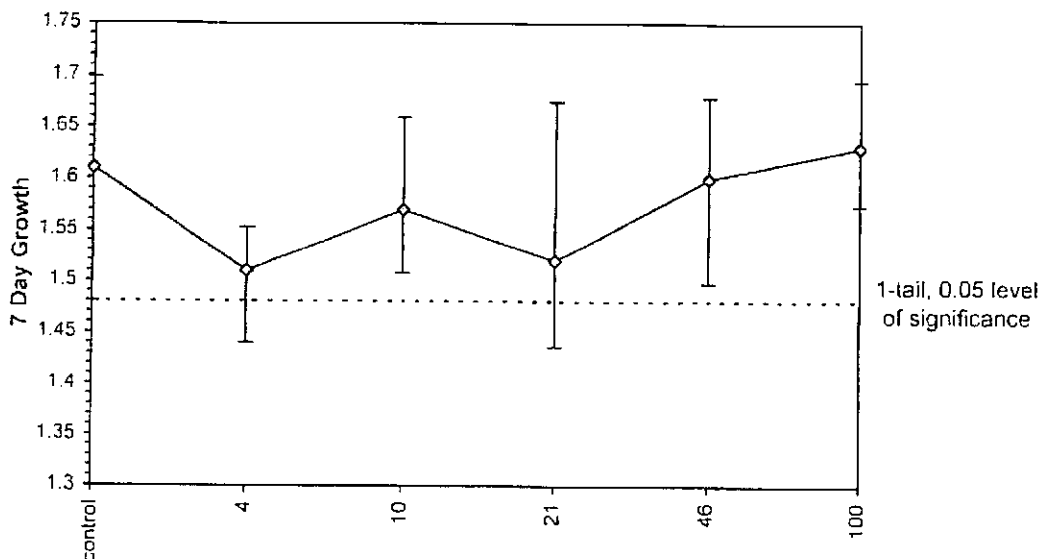
Start Date: 5/16/2012 Test ID: 1207496CV Sample ID: 1207496CV  
End Date: 5/23/2012 Lab ID: JRR Sample Type: EFF1-POTW  
Sample Date: Protocol: EPAM 94-EPA/600/4-91/003 Test Species: CV-Cyprinodon variegatus  
Comments:

Conc-mg/L	1	2	3	4
control	1.7002	1.6343	1.6314	1.4816
4	1.5181	1.4379	1.5255	1.5506
10	1.5058	1.5276	1.6571	1.5821
21	1.4642	1.4343	1.6739	1.5013
46	1.6069	1.5008	1.6811	1.6205
100	1.6512	1.6072	1.6980	1.5768

Conc-mg/L	Mean	N-Mean	Transform: Untransformed				N	t-Stat	1-Tailed Critical	MSD
			Mean	Min	Max	CV%				
control	1.6119	1.0000	1.6119	1.4816	1.7002	5.737	4			
4	1.5080	0.9356	1.5080	1.4379	1.5506	3.234	4	1.912	2.410	0.1309
10	1.5682	0.9729	1.5682	1.5058	1.6571	4.300	4	0.805	2.410	0.1309
21	1.5184	0.9420	1.5184	1.4343	1.6739	7.061	4	1.721	2.410	0.1309
46	1.6023	0.9941	1.6023	1.5008	1.6811	4.679	4	0.176	2.410	0.1309
100	1.6333	1.0133	1.6333	1.5768	1.6980	3.236	4	-0.395	2.410	0.1309

Auxiliary Tests					Statistic	Critical	Skew	Kurt			
Shapiro-Wilk's Test indicates normal distribution ( $p > 0.05$ )					0.98018	0.916	0.17519	-0.0595			
Bartlett's Test indicates equal variances ( $p = 0.78$ )					2.4555	15.0863					
Hypothesis Test (1-tail, 0.05)		NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test		100	>100			0.13087	0.08119	0.01058	0.0059	0.16484	5, 18
Treatments vs control											

Dose-Response Plot



# Larval Fish Growth and Survival Test-7 Day Growth

Start Date: 5/16/2012 Test ID: 1207496CV Sample ID: 1207496CV  
 End Date: 5/23/2012 Lab ID: JRR Sample Type: EFF1-POTW  
 Sample Date: Protocol: EPAM 94-EPA/600/4-91/003 Test Species: CV-Cyprinodon variegatus  
 Comments:

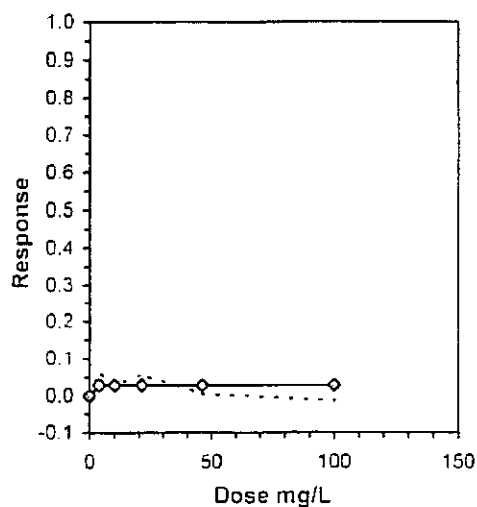
Conc-mg/L	1	2	3	4
control	1.7002	1.6343	1.6314	1.4816
4	1.5181	1.4379	1.5255	1.5506
10	1.5058	1.5276	1.6571	1.5821
21	1.4642	1.4343	1.6739	1.5013
46	1.6069	1.5008	1.6811	1.6205
100	1.6512	1.6072	1.6980	1.5768

Conc-mg/L	Transform: Untransformed							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
control	1.6119	1.0000	1.6119	1.4816	1.7002	5.737	4	1.6119	1.0000
4	1.5080	0.9356	1.5080	1.4379	1.5506	3.234	4	1.5660	0.9716
10	1.5682	0.9729	1.5682	1.5058	1.6571	4.300	4	1.5660	0.9716
21	1.5184	0.9420	1.5184	1.4343	1.6739	7.061	4	1.5660	0.9716
46	1.6023	0.9941	1.6023	1.5008	1.6811	4.679	4	1.5660	0.9716
100	1.6333	1.0133	1.6333	1.5768	1.6980	3.236	4	1.5660	0.9716

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ( $p > 0.05$ )	0.98018	0.916	0.17519	-0.0595
Bartlett's Test indicates equal variances ( $p = 0.78$ )	2.4555	15.0863		

## Linear Interpolation (200 Resamples)

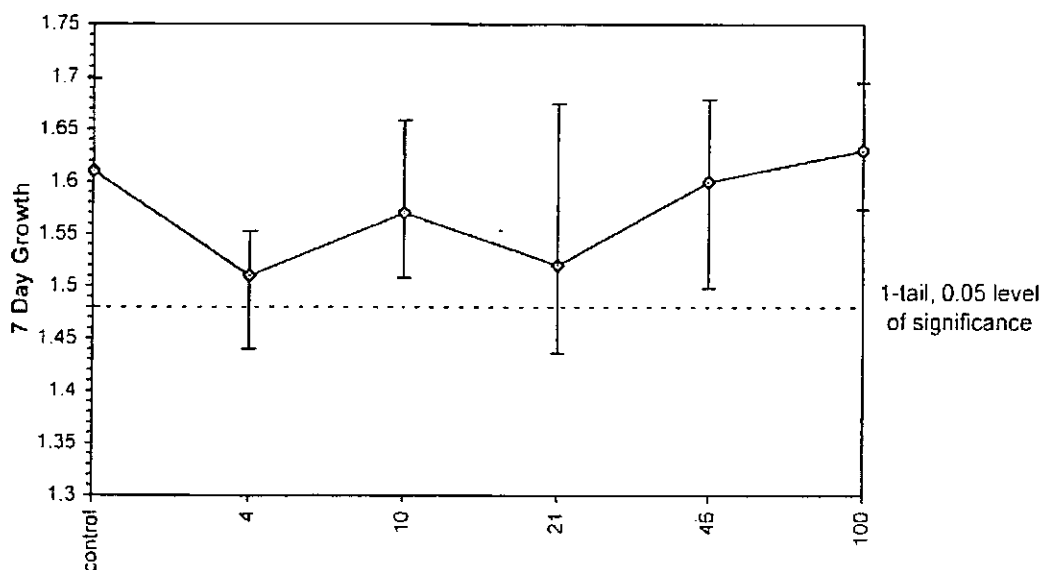
Point	mg/L	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25 ✓	>100			
IC40	>100			
IC50	>100			



# Larval Fish Growth and Survival Test-7 Day Growth

Start Date: 5/16/2012	Test ID: 1207496CV	Sample ID: 1207496CV
End Date: 5/23/2012	Lab ID: JRR	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAM 94-EPA/600/4-91/003	Test Species: CV-Cyprinodon variegatus
Comments:		

Dose-Response Plot



# **Toxicity Test Sample Chain of Custody** (Please complete all information)

Facility KGSA- DAHLGREN WASTEWATER TREATMENT PLANTNPDES# VA0026514Address 16383 Dahlgren Rd King George, Virginia 22485County King George County Pipe/Outfall/Location 001 / Lower Williams Creek

Flow Type (Circle One): Continuous Intermittent Batch Stormwater Other: \_\_\_\_\_

Instream Waste Conc \_\_\_\_\_

**Type of sample :**

(Grab): Date \_\_\_\_\_ Time \_\_\_\_\_ Amount of Sample Collected \_\_\_\_\_

X (Time Composite): Collected from (Date/Time): 6:00 AM May 14, 2012To (Date/Time): 6:00 AM May 15, 2012Number/Volume of Subsamples: 150 mL Time Increment : 15 min Total Amount Collected: 9000 mL

(Flow-Proportional Composite): Collected from (Date/Time): \_\_\_\_\_

To (Date/Time): \_\_\_\_\_

Set Volume Subsample/Volume Flow: \_\_\_\_\_ Total Amount Collected: \_\_\_\_\_

For variable volume subsamples based on flow/set time increments --Attach sample and flow information.

Sample collected by: (print) \_\_\_\_\_ Affiliation: \_\_\_\_\_  
(sign) \_\_\_\_\_\*Temperature of sample in sample collection device 2.0/6.5 °C\*Final temperature of effluent at sample collection point 21.1 °C\*Is sample collection device chilled? YES Is sample packed on ice for shipment? YES

\*It is required that all samples remain at 0-6°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency ( Do not freeze!)

Is the sample chlorinated? NO dechlorinated? NO If so, how? \_\_\_\_\_Permit with interim chlorine limit? NA If yes- limit (mg/L) NAField pH 7.66 Field Total Residual Chlorine NA Time: \_\_\_\_\_Name of Analyst : Daniel L. Powell Affiliation : Lead OperatorComments/Sample description Dahlgren WWTP Final Effluent 24hr composite 3.5 galMethod of Shipment: Driven to lab w/ County VehicleShipment Date / Time: May 15, 2012Type of test(s) to be performed 7- Day Chronic / Toxicity Test(Specify organisms) Mysidopsis Bahia and Cyprinodon Variegatus**PRINT & SIGN NAMES**Relinquished by print Daniel L. Powell /sign [Signature] Date/Time 5/15/12 7:00 amReceived by print David Miller /sign [Signature] Date/Time 5/15/12 7:00 amRelinquished by print David Miller /sign [Signature] Date/Time 5/15/12 7:26 AMReceived by print Jeff Hockaday /sign [Signature] Date/Time 5/15/12 7:26 AMRelinquished by print Jeff Hockaday /sign [Signature] Date/Time 5/15/12 9:12 AMReceived by print Mealyhall /sign [Signature] Date/Time 5/15/12 9:35**EFFLUENT CONDITION UPON ARRIVAL AT LABORATORY**JRA # 1207496A Arrival Temperature 1.20°C Date : 5/15/12 Time: 9:35 Ice Present: (Yes/No)Sample Volume: 3.56L Color Light brown Odor Some Solids some pH 7.85 DO (mg/L) 10.4Conductivity (umhos/cm) 613 @ 25.2 °C Salinity (ppt) < 1 TRC (mg/L) < 0.02Method (For TRC) HACH8167 Analyst: [Signature]



# **Toxicity Test Sample Chain of Custody** (Please complete all information)

Facility **KGSA- DAHLGREN WASTEWATER TREATMENT PLANT**

NPDES# **VA0026514**

Address **16383 Dahlgren Rd King George, Virginia 22485**

County **King George County** Pipe/Outfall/Location **001 / Lower Williams Creek**

Flow Type (Circle One): Continuous Intermittent Batch Stormwater Other: \_\_\_\_\_

Instream Waste Conc \_\_\_\_\_

**Type of sample :**

(Grab): Date \_\_\_\_\_ Time \_\_\_\_\_ Amount of Sample Collected \_\_\_\_\_

**X** (Time Composite): Collected from (Date/Time): **6:00 AM May 16, 2012**

To (Date/Time): **6:00 AM May 17, 2012**

Number/Volume of Subsamples: **150 mL** Time Increment : **15 min** Total Amount Collected: **9000 mL**

(Flow-Proportional Composite): Collected from (Date/Time): \_\_\_\_\_

To (Date/Time): \_\_\_\_\_

Set Volume Subsample/Volume Flow: \_\_\_\_\_ Total Amount Collected: \_\_\_\_\_

For variable volume subsamples based on flow/set time Increments --Attach sample and flow information.

Sample collected by: (print) \_\_\_\_\_ Affiliation: \_\_\_\_\_

(sign) \_\_\_\_\_

\*Temperature of sample in sample collection device **5.7/11.3 °C**

\*Final temperature of effluent at sample collection point **21.8 °C**

\*Is sample collection device chilled ? **YES** Is sample packed on ice for shipment ? **YES**

**\*It is required that all samples remain at 0-6°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency ( Do not freeze!)**

Is the sample chlorinated? **NO** dechlorinated ? **NO** If so, how ? \_\_\_\_\_

Permit with interim chlorine limit ? **NA** If yes- limit (mg/L) **NA**

Field pH **7.67** Field Total Residual Chlorine **NA** Time: \_\_\_\_\_

Name of Analyst : **Daniel L. Powell** Affiliation : **Lead Operator**

Comments/Sample description **Dahlgren WWTP Final Effluent 24hr composite 2.5 gal**

Method of Shipment: **Driven to lab w/ County Vehicle**

Shipment Date / Time: **May 17, 2012**

Type of test(s) to be performed **7- Day Chronic / Toxicity Test**

(Specify organisms) **Mysidopsis Bahia and Cyprinodon Variegatus**

**PRINT & SIGN NAMES**

Relinquished by print **Daniel L. Powell** /sign *Daniel L Powell* Date/Time **5/17/12 6:40 am**

Received by print **Robert Warner** /sign *Robert Warner* Date/Time **5/17/12 6:40 am**

Relinquished by print **Robert Warner** /sign *Robert Warner* Date/Time **5/17/12 9:15**

Received by print *Mindy Hall* /sign *Mindy Hall* Date/Time **5/17/12 9:15**

Relinquished by print \_\_\_\_\_ /sign \_\_\_\_\_ Date/Time \_\_\_\_\_

Received by print \_\_\_\_\_ /sign \_\_\_\_\_ Date/Time \_\_\_\_\_

**EFFLUENT CONDITION UPON ARRIVAL AT LABORATORY**

JRA # **12 07496 B** Arrival Temperature **0.1 °C** Date : **5-17-12** Time: **9:15** Ice Present: **Yes/ No**

Sample Volume: **2.5 Gal** Color **Light brown** Odor **Some** Solids **Some** pH **7.73** DO (mg/L) **9.7**

Conductivity (µmhos/cm) **520** @ **25.2** °C Salinity (ppt) **<1** TRC (mg/L) **<0.02**

Method (For TRC) **HACH8167** Analyst: *hach*



**Toxicity Test Sample Chain of Custody**  
(Please complete all information)

Facility **KGSA- DAHLGREN WASTEWATER TREATMENT PLANT**

NPDES# **VA0026514**

Address **16383 Dahlgren Rd King George, Virginia 22485**

County **King George County** Pipe/Outfall/Location **001 / Lower Williams Creek**

Flow Type (Circle One) Continuous Intermittent Batch Stormwater Other: \_\_\_\_\_

Instream Waste Conc \_\_\_\_\_

**Type of sample :**

\_\_\_\_ (Grab): Date \_\_\_\_\_ Time \_\_\_\_\_ Amount of Sample Collected \_\_\_\_\_

X (Time Composite): Collected from (Date/Time): **6:00 AM May 18, 2012**

To (Date/Time): **6:00 AM May 19, 2012**

Number/Volume of Subsamples: **150 mL** Time Increment : **15 min** Total Amount Collected: **9000 mL**

(Flow-Proportional Composite): Collected from (Date/Time): \_\_\_\_\_

To (Date/Time): \_\_\_\_\_

Set Volume Subsample/Volume Flow: \_\_\_\_\_

Total Amount Collected: \_\_\_\_\_

For variable volume subsamples based on flow/set time increments --Attach sample and flow information.

Sample collected by: (print) \_\_\_\_\_ Affiliation: \_\_\_\_\_

(sign) \_\_\_\_\_

\*Temperature of sample in sample collection device **3.0/8.9 °C**

\*Final temperature of effluent at sample collection point **21.8 °C**

\*Is sample collection device chilled ? **YES** Is sample packed on ice for shipment ? **YES**

**\*It is required that all samples remain at 0-6°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency ( Do not freeze!)**

Is the sample chlorinated? **NO** dechlorinated ? **NO** If so, how ? \_\_\_\_\_

Permit with interim chlorine limit ? **NA** If yes- limit (mg/L) **NA**

Field pH **7.73** Field Total Residual Chlorine **NA** Time: \_\_\_\_\_

Name of Analyst : **Daniel L. Powell** Affiliation : **Lead Operator**

Comments/Sample description **Dahlgren WWTP Final Effluent 24hr composite 2.5 gal**

Method of Shipment: **Driven to lab w/ County Vehicle**

Shipment Date / Time: **May 19, 2012**

Type of test(s) to be performed **7- Day Chronic / Toxicity Test**

(Specify organisms) **Mysidopsis Bahia and Cyprinodon Variegatus**

**PRINT & SIGN NAMES**

Relinquished by print <b>Daniel L. Powell</b>	/sign _____	Date/Time <b>5/19/12</b>
Received by print _____	/sign _____	Date/Time <b>5/19/12</b>
Relinquished by print _____	/sign _____	Date/Time _____
Received by print _____	/sign _____	Date/Time _____
Relinquished by print _____	/sign _____	Date/Time _____
Received by print <u>Kelli Hu</u>	/sign <u>Kelli Hu</u>	Date/Time <u>5/19/12 @ 830</u>

**EFFLUENT CONDITION UPON ARRIVAL AT LABORATORY**

JRA # 12-0749 Arrival Temperature 7.6 °C Date: 5/19/12 Time: 830 Ice Present: Yes / No

Sample Volume: 2.5 Color Light + bro Odor Some Solids Some pH 7.70 DO (mg/L) 9.9

Conductivity (µmhos/cm) 534 @ 25.3 °C Salinity (ppt) <1 TRC (mg/L) <0.02

Method (For TRC) **HACH8167**

Analyst: Kelli Hu